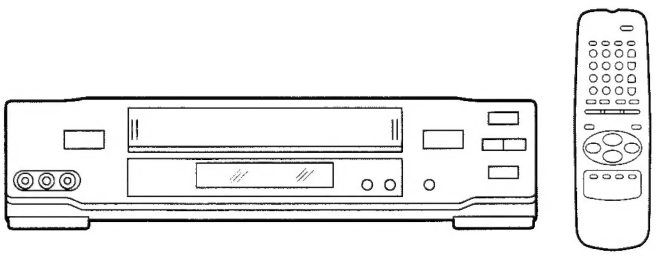
TOSHIBA

FILE NO. 110-9412

SERVICE MANUAL

VIDEO CASSETTE RECORDER

V-204G



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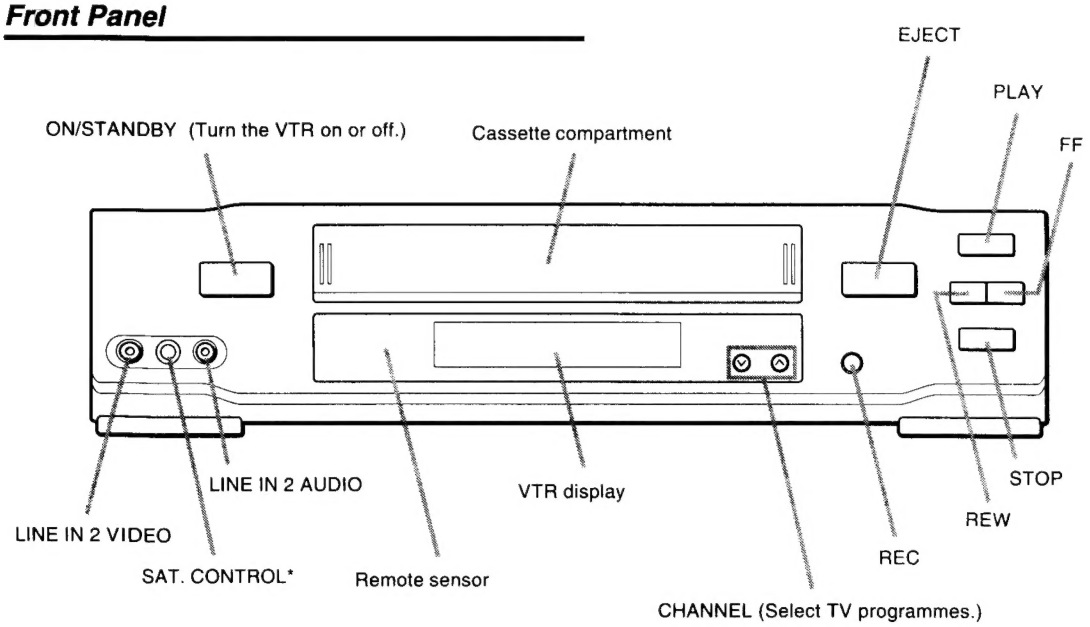
SECTION 1
GENERAL DESCRIPTIONS

OPERATING INSTRUCTIONS

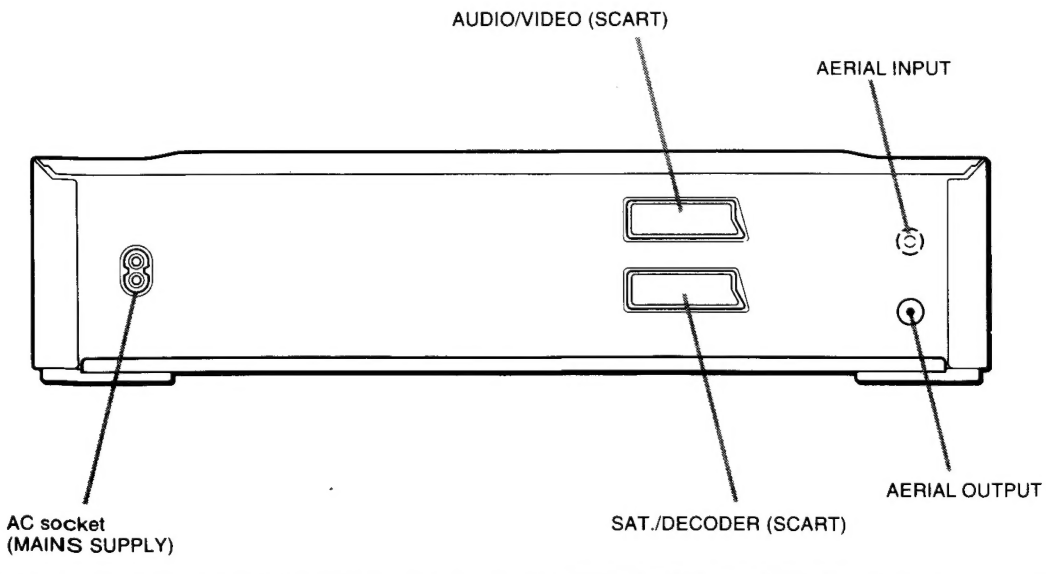
1 IDENTIFICATION OF CONTROLS

Front Panel

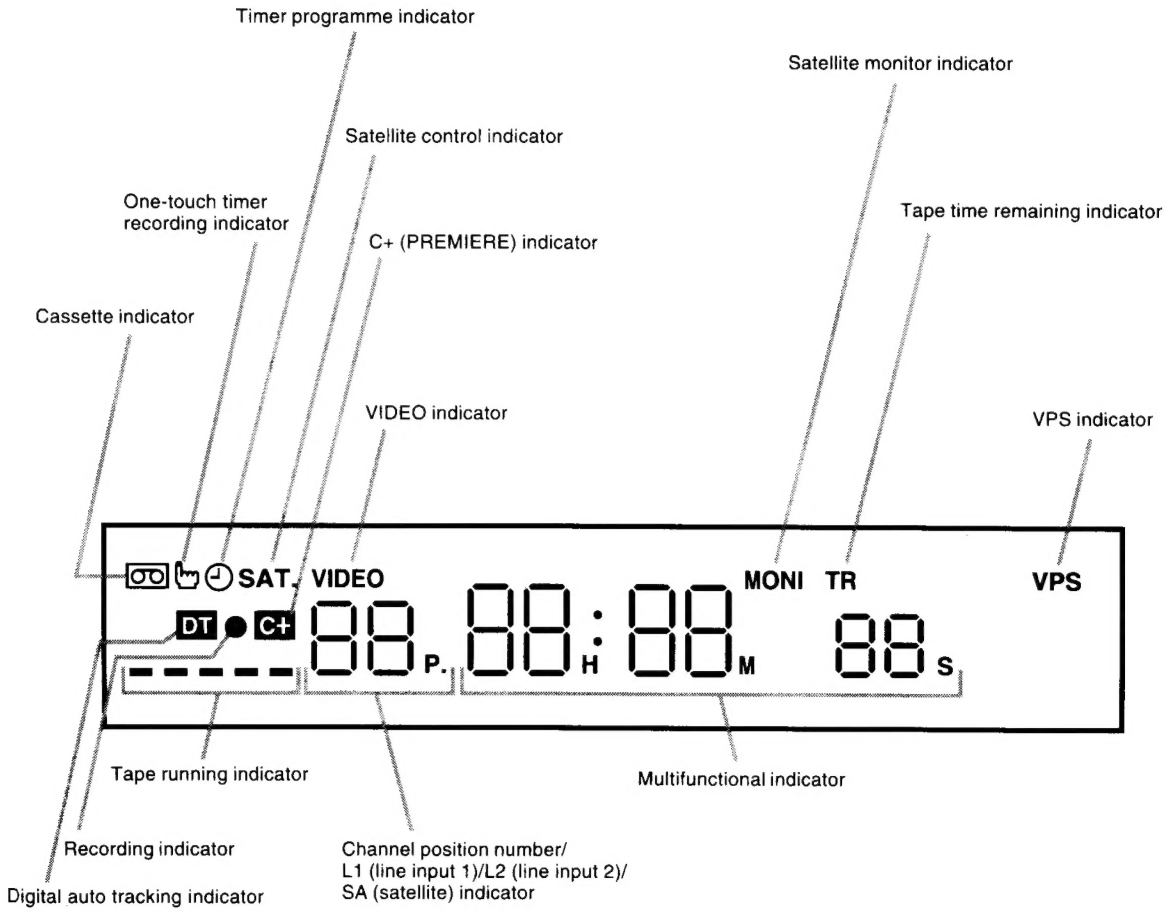


*This jack is for a special case of satellite receiver setting. Not in general use.

Rear Panel

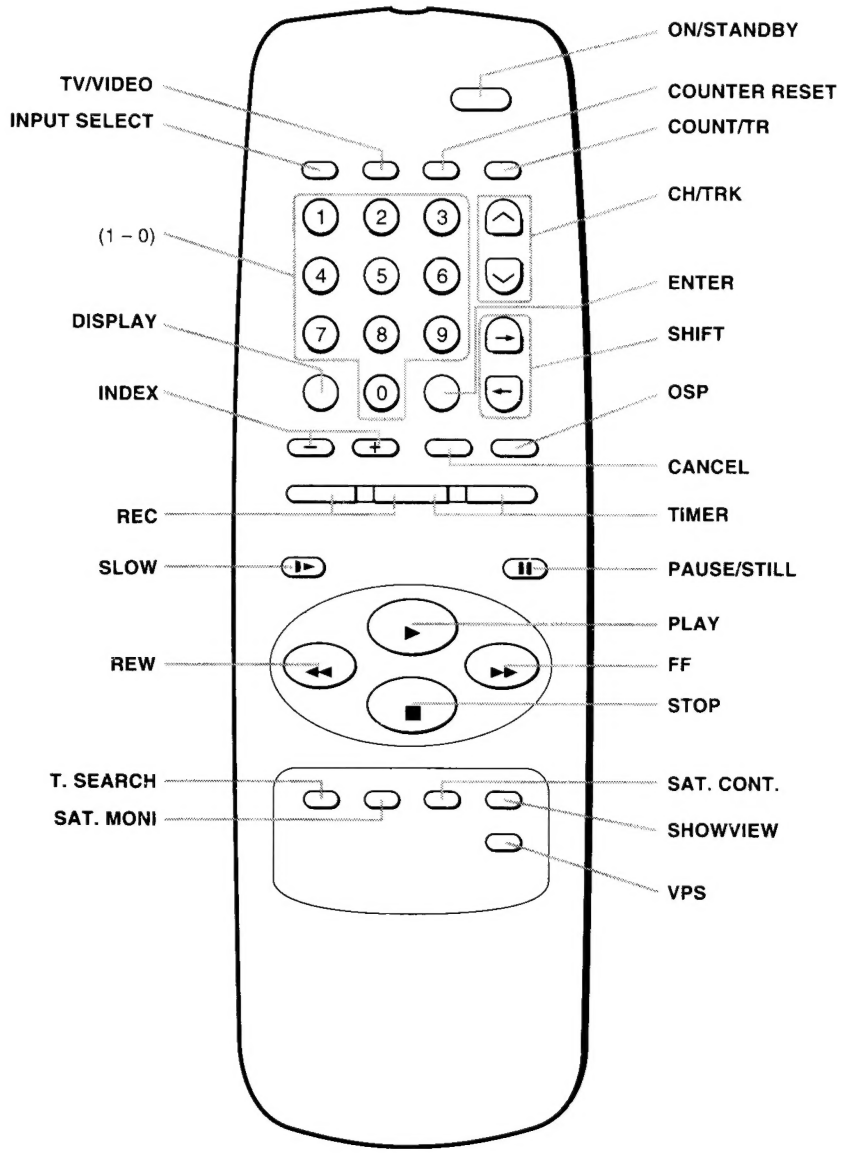


VTR Display


Timer programme indicator
Satellite monitor indicator
Satellite control indicator
One-touch timer recording indicator
Tape time remaining indicator
C+ (PREMIERE) indicator
Cassette indicator
VIDEO indicator
VPS indicator
SAT.
VIDEO
MONI
TR
VPS
DT
C+
P.
H
M
S
Tape running indicator
Multifunctional indicator
Recording indicator
Channel position number/
L1 (line input 1)/L2 (line input 2)/
SA (satellite) indicator
Digital auto tracking indicator

1 IDENTIFICATION OF CONTROLS

Remote Controller



2 HOW TO ALLOCATE A TV CHANNEL TO THE VIDEO CHANNEL

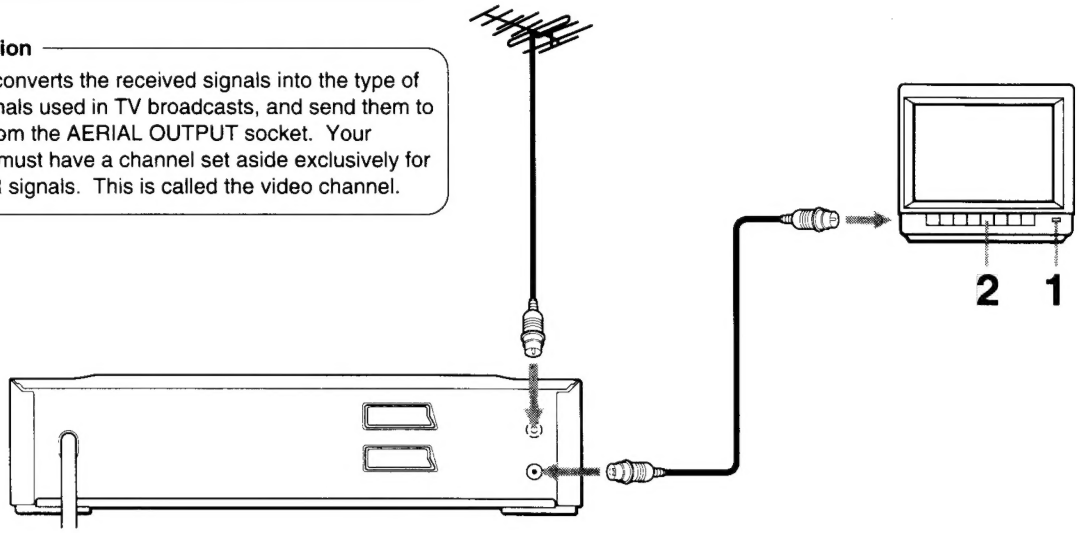
To watch or record video pictures with the aerial connection, set your TV receiving the video signals through the aerial cable from the VTR.

Important

The following adjustment is necessary when the VTR is connected to the TV via the AERIAL OUTPUT socket only.

Information

The VTR converts the received signals into the type of output signals used in TV broadcasts, and send them to your TV from the AERIAL OUTPUT socket. Your television must have a channel set aside exclusively for these VTR signals. This is called the video channel.



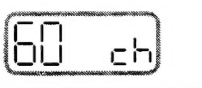
1 Turn on the TV.

2 Select a free station on the TV which you wish to use for your video picture, for example station 5.
This station 5 will be only used for watching a video picture.

3 Press the **ON/STANDBY** button to turn on the VTR.

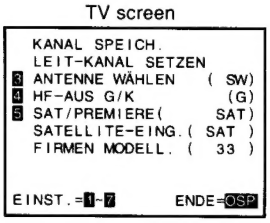
4 Hold down the **OSP** button **for more than 5 seconds.**

VTR display

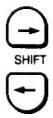


5 Tune the TV (on station 5 for example in step 2) to around UHF channel 60 so that the following screen is shown clearly.
(For tuning the TV, refer to the TV's manual.)

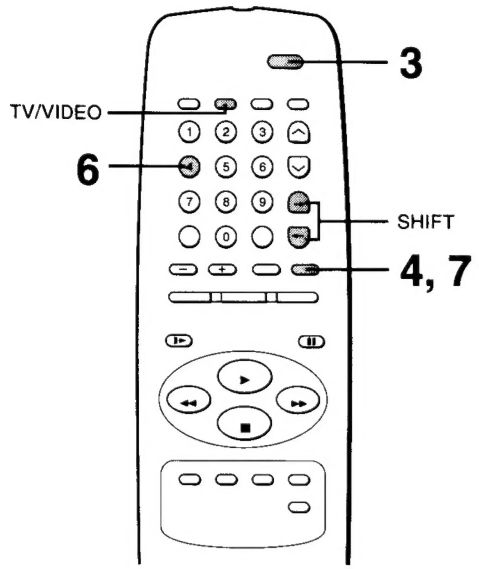
TV screen

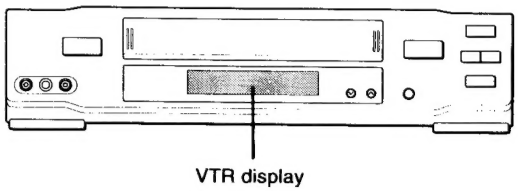


If after tuning (in step 5), you still have some interference because of neighbouring broadcast channels, press the **SHIFT** button to select another video channel eg. between channels 53 and 67.



Re-tune the TV to around UHF channel 62 (for example), and confirm the screen is displayed clearly.





6 Press **number button 4** to select "G" or "K" on the screen according to the TV system of your country.

④

```
KANAL SPEICH.
LEIT-KANAL SETZEN
3 ANTENNE WÄHLEN    ( SW)
4 HF-AUS G/K          (G)
5 SAT/PREMIERE(      SAT)
  SATELLITE-EING.( SAT )
  FIRMEN MODELL. (  33 )

EINST.=1-9        ENDE=OSP
```

G: Germany, Italy, Switzerland and the Middle and Near East countries
K: Russia, Czecho, Slovakia, Hungary, etc.

Note
If this setting is incorrect, a clear picture and sound is not obtained.

7 Press the **OSP** button.
Video channel setting is complete.

Note
The TV screen here is on the PAL system. If the connected TV is on a SECAM or NTSC system, you will not get a clear screen.

Note on the Antenna Output

On the screen in step 7, the antenna output can be set to "SW" or "MIX".
(applied only when the VTR is connected to your TV only via the AERIAL OUTPUT socket.)

Press **number button 3** to set "SW " or "MIX".

③

```
KANAL SPEICH.
LEIT-KANAL SETZEN
3 ANTENNE WÄHLEN    ( SW)
4 HF-AUS G/K          (G)
5 SAT/PREMIERE(      SAT)
  SATELLITE-EING.( SAT )
  FIRMEN MODELL. (  33 )

EINST.=1-9        ENDE=OSP
```

SW: You can watch a video picture on the video channel only when the "VIDEO" indicator is lit in the VTR display by pressing the TV/VIDEO button.

MIX: You can watch a video picture on the video channel regardless of whether or not you have pressed the TV/VIDEO button.
If video pictures or TV pictures cannot be obtained clearly, set to "SW".

2 SETTING THE LANGUAGE/SETUP SCREEN

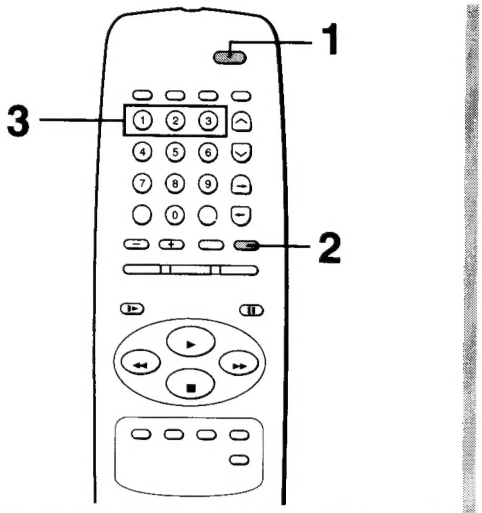
Before operating the VTR, you can select the language diplayed on the TV screen.

Important

It is necessary to choose the language you want to use before making any setting such as clock setting, setup setting, etc.
The language setting is also required when 0:00 blinks in the VTR display as the VTR is first connected to an AC socket or after a power failure has occurred.

Preparation

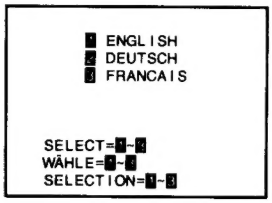
- Confirm the TV is on and set it to the video input mode, or select the video channel if you made the aerial connection for the TV and the VTR.



Setting the Language

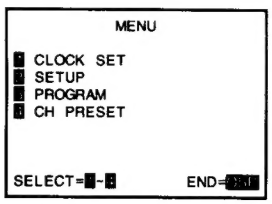
1 Press the **ON/STANDBY** button to turn the VTR on.

2 Press the **OSP** button.
The language select screen appears.



3 Press **number button 1 to 3** to select a language.

(1) or (2) or (3)

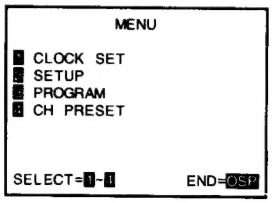


Number button 1 : English
Number button 2 : German
Number button 3 : French

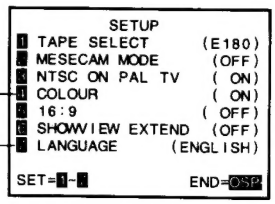
When you select a language, the TV screen changes into the MENU screen.

MENU/SETUP Screen

The MENU screen appears after the language setting. For details on each item, refer pages respectively as below.



Press **number button 2**.
The SETUP screen will appear on the TV.



Even if you have completed the language setting, you can change it by pressing **number button 7** repeatedly.

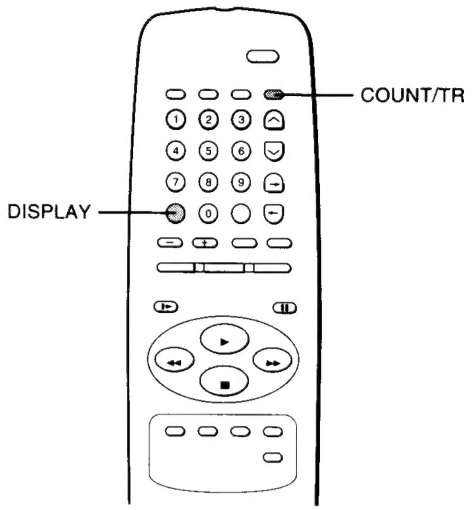
If the TV programme or the tape is monochrome, press **number button 4** to set to "OFF".

2 ON SCREEN DISPLAY

The VTR tells you current operating modes on the TV screen.

Information

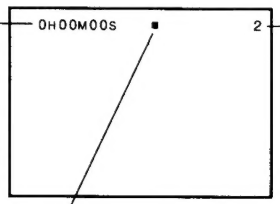
- When you press the DISPLAY button, the VTR displays the current operating mode on the TV screen.
- In addition to the indication shown below, the VTR may display other indications such as index search.



Pressing the **DISPLAY** button makes the operation mode appear. If you press this button again, the indication goes off, leaving the counter indication (counter, tape remaining, clock) on the screen. To turn it off, press the **DISPLAY** button once more.

Counter indication
- Linear time counter
- Tape time remaining
- Clock

Each time the **COUNT/TR** button is pressed, the indication changes.



Channel position number

The indicator varies with the operating mode.

Ejecting a tape	⏏
Stop	■
Fast-forwarding Forward picture search	▶▶
Rewinding Reverse picture search	◀◀
Recording	●
Recording pause	❚❚●
Playback	▶
Still picture Frame advance	❚❚
Slow playback	❚▶

2 HOW TO ALLOCATE TV STATIONS ON THE VTR

To watch and record TV programmes via the VTR, it is first necessary to store each TV station in the memory of the VTR. This VTR can store up to 48 positions for TV broadcasting stations.

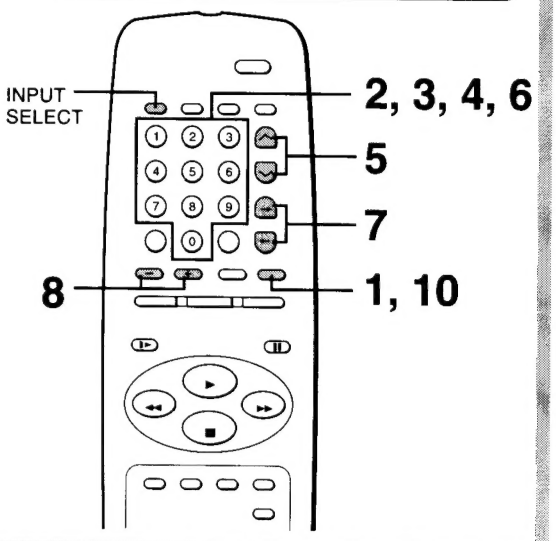
Information

To receive broadcast programmes on this VTR, it is necessary to set the tuning range number correctly according to the television system used in your area. The TV channel numbers in the parentheses are indicated in the VTR display.

Television system	Tuning range number	Band	TV channel number
PAL B/G (Germany, Italy, Switzerland, etc.) SECAM B/G (Middle and Near East countries)	1	VHF UHF CATV	E2 – E12 (2 – 12) A – H, H1, H2 (13 – 20, 11, 12) E21 – E69 (21 – 69) X, Y, Z (71, 72, 73)
	2	CATV	S1 – S41(1 – 41)
SECAM D/K (Russia, Czecho, Slovakia, Hungary, etc.)	3	VHF UHF	R1 – R12 (1 – 12) E21 – E69 (21 – 69)

Preparation

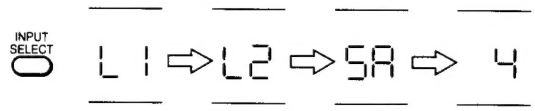
- Select the video channel or video input mode on the TV.
- Turn on the VTR.
- If you use a satellite receiver or a PREMIERE-decoder, make the connection correctly and turn it on.



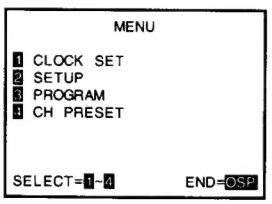
Example **to store UHF 26 channel of the PAL B/G to position number 1.**

Important

If the "L1", "L2" or "SA" indicator appears in the VTR display, press the INPUT SELECT button so that the position number appears.

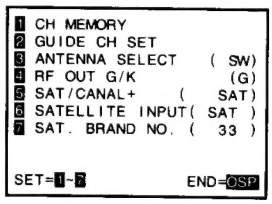


1 Press the **OSP** button.



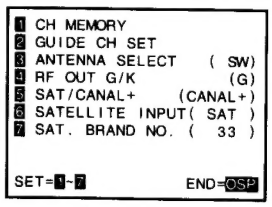
2 Press **number button 4**.

④



3 According to whether you have connected a satellite receiver or a PREMIERE-decoder to the SAT./DECODER socket, set "SAT/CANAL+" to "SAT" or "CANAL+" by pressing **number button 5**.
Skip this step if you have not connected either.

⑤

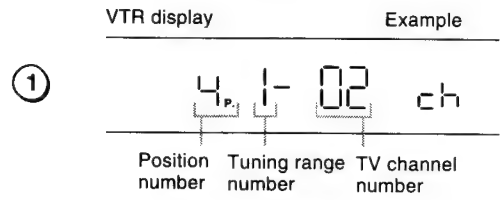


Each time you press number button 5, "SAT" or "CANAL+" appears alternately.

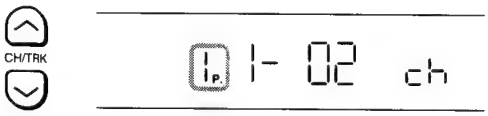
SAT: to use a satellite receiver connected to the SAT./DECODER socket.

CANAL+: to use a PREMIERE-decoder connected to the SAT./DECODER socket.

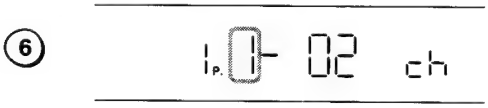
4 Press **number button 1** to select "CH MEMORY".
The VTR enters the tuning mode.



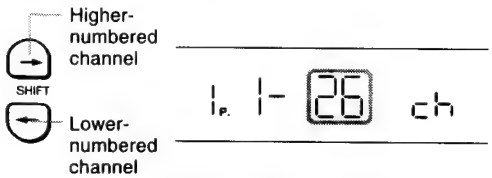
5 Press the **CH/TRK** button to select position number 1 for this example.



6 Press **number button 6** to select a tuning range number.
Each time you press the button, the number changes cyclically. Select tuning range number 1 (PAL B/G) for this example.



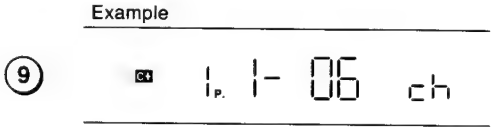
7 Press and hold the **SHIFT** button to search for a TV station you want to store.
Search for TV channel number 26 for this example.



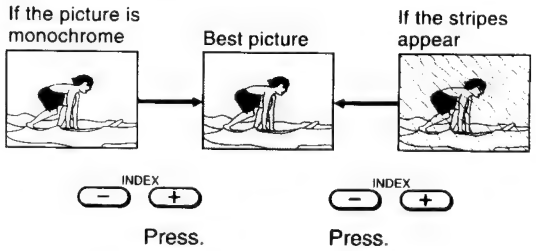
- If the received TV station signal is tuned in, searching stops automatically. Press and hold the **SHIFT** button to restart channel search operation.

Storing PREMIERE channels

When the PREMIERE channel has been located with the searching function, press **number button 9**.
The "C+" indicator appears in the VTR display.



8 If a clear picture does not appear on the TV screen after searching is finished, make fine adjustment with the **INDEX** buttons.



9 Repeat steps 5 to 8 for other TV stations.
For this example, since position number 1 is already used, store other TV channels using position numbers 2, 3 . . . 48 in step 5.

Record all position numbers you stored on the VTR in the chart so that you will be ready to use the SHOWVIEW recording.

10 Press the **OSP** button.
Channel tuning is now completed.

Once channel tuning is done, you will select the TV station by selecting the position number on which the desired TV station is stored.

2 HOW TO ALLOCATE TV STATIONS ON THE VTR

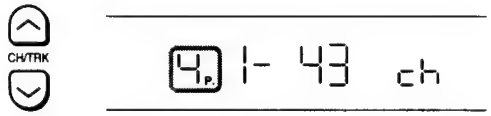
Skipping Channels

You can prevent the use of certain channel position numbers when you use the skip function.

1) Set the VTR to the tuning mode following steps 1 to 4 of the channel storing procedure.

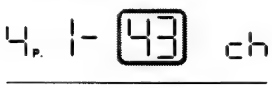
2) Select the position number you want to skip with the **CH/TRK** button.

Example **to skip position number 4**



3) Press **number button 3**.
The following indication will appear in the VTR display with the skip function on or off.

Channel skip off



Channel skip on

If you press **number button 3** again, the TV channel number will appear and the skip function will be cancelled.

4) Press the **OSP** button.
Channel skipping is now completed.

To cancel channel skipping
Follow steps **1)** to **4)** above.

Preparation for SHOWVIEW Recording

To make the initial setting for SHOWVIEW recording, prepare the list below.
For all TV stations you have stored on the VTR following the procedure, fill in the blanks with the position number you used, and the corresponding GUIDE channel.
The GUIDE channel has been already been allocated to each TV station. You can get the numbers from charts carried in some TV magazines.

TV stations	GUIDE channel	Position number in which the TV station has been memorized on the VTR (in step 5)
ex. XXX	ex. 001	ex. 1

TV stations	GUIDE channel	Position number in which the TV station has been memorized on the VTR (in step 5)

Enter the number allocated to each TV station looking up TV magazines.

2 SETTING THE CLOCK

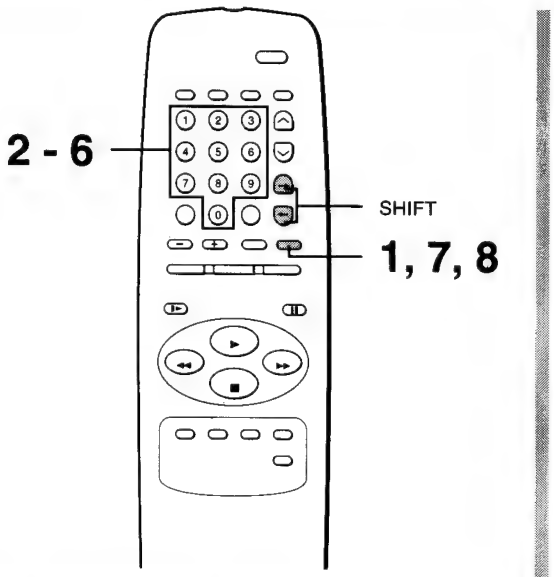
When the VTR is first connected to the AC socket or after a power failure, "0:00" blinks in the VTR display and it is necessary to set the clock.

Preparation

- Turn on the VTR.
- Select the video channel or video input mode on the TV.

Information

The item to be set will blink. Set the data with the number buttons, following the blinking position. You can change the blinking position by pressing the SHIFT (→/←) buttons.



Example **to set the clock to 15:30 on October 5, 1994.**

1 Press the **OSP** button.


```
MENU
1 CLOCK SET
2 SETUP
3 PROGRAM
4 CH PRESET

SELECT=1~4          END=OSP
```

2 Press **number button 1**.

①

```
--:--    1. 1.'94 SA
HOUR. MIN.  DATE MONTH YEAR

SUMMER TIME  (OUT)
  IN=1       OUT=2
                END=OSP
```

3 To set the clock for summer time (daylight saving), press **number button 1**: if not set, press **number button 2**.

① ②

```
-:--    1. 1.'94 SA
HOUR MIN.  DATE MONTH YEAR

SUMMER TIME  (OUT)
                END=OSP
```

4 Set the hours and minutes. (24 hours clock format)

① → ⑤ → ③ → ⓪

```
15:30   01. 1.'94 SA
HOUR MIN.  DATE MONTH YEAR

SUMMER TIME  (OUT)
                END=OSP
```

Correcting a mistake

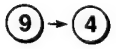
Press the SHIFT (←) button repeatedly until the number you set incorrectly blinks. Press the correct number button and then press the SHIFT (→) button to return to the previous digit.

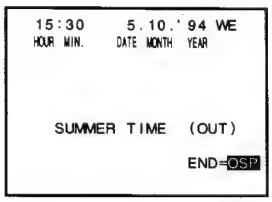
5 Set the day and month.

⓪ → ⑤ → ① → ⓪

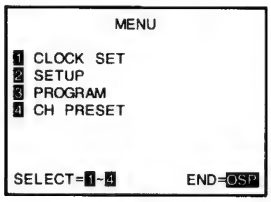
```
15:30   5.10.'94 WE
HOUR MIN.  DATE MONTH YEAR

SUMMER TIME  (OUT)
                END=OSP
```

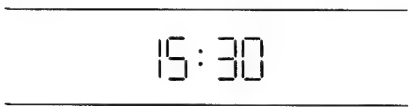
6 Set the year.
Press the numbers of the last two figures.





7 Press the **OSP** button.
Now the clock starts.





8 Press the **OSP** button to return to the normal TV screen.

Notes
- If you input irregular clock data such as February 29, 1994, it will not be accepted.
- The built-in calendar of this VTR is valid from 1990 to 2089.

Resetting the VTR clock

If a power failure of short duration has occurred, the colon between the hour and minutes digits in the VTR display blinks.
The time displayed may be incorrect.

In this case, you must set the VTR clock again.
Follow the clock setting procedure.

3 LOADING/EJECTING A VIDEO CASSETTE

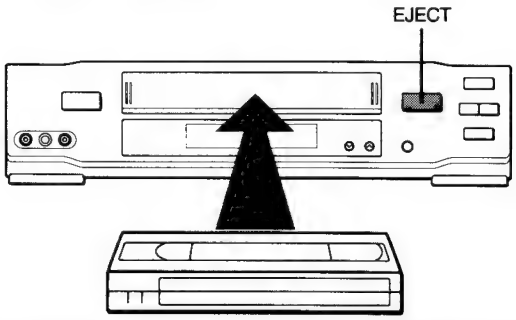
This section explains how to handle video cassettes.

■ **Loading a video cassette**

Push the cassette into the cassette compartment with the window side facing up and the label side towards the front.
The power is automatically turned on. The [OO] mark will appear in the VTR display.

■ **Ejecting a cassette**

Press the **EJECT** button. The cassette is ejected from the cassette compartment.

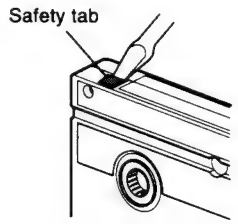


Precautions When Using Video Cassettes

- Video cassettes have a safety tab to prevent accidental erasure. If the tab has already been removed, recording cannot be performed.

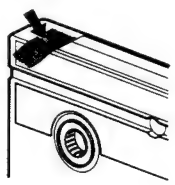
To prevent accidental erasure

Remove this safety tab with a screwdriver.



To record again

Cover the tab hole with adhesive tape.



- Avoid exposing cassettes to direct sunlight. Keep them away from heaters.
  Avoid extreme humidity, vibrations or shock, strong magnetic fields (near a motor, transformer or magnet) and dusty place.
- Place cassettes in their cassette cases and store them in a vertical position.
- Do not insert hand(s) or any foreign object(s) into the cassette compartment as injury may result or the VTR may be damaged.
- Children using the VTR should be supervised.

3 SETTING THE VIDEO SYSTEM (MESECAM MODE)

It is necessary to set the video system (MESECAM MODE) properly to make a recording or playback of recorded tapes.

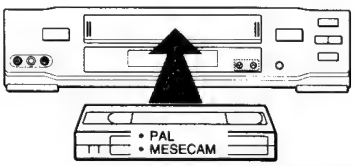
Information

Set the "MESECAM MODE" according to the television system of a TV programme you want to record or the video system of a tape you want to play back.

Video systems compatible with this VTR

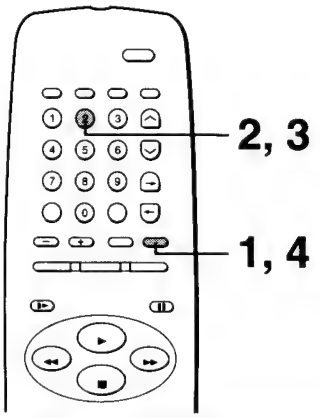
PAL tape: tapes recorded in the PAL video system commercially available in the market, and tapes on which PAL broadcast programmes were recorded.

MESECAM tape: tapes on which SECAM broadcast programmes were recorded with a MESECAM system VTR.



Preparation

- Turn on the VTR.
- Select the video channel or video input mode on the TV.



1 Press the **OSP** button.

OSP

```
MENU
1 CLOCK SET
2 SETUP
3 PROGRAM
4 CH PRESET

SELECT=1~4          END=OSP
```

2 Press **number button 2**.

(2)

```
SETUP
1 TAPE SELECT      (E180)
2 MESECAM MODE      (OFF)
3 NTSC ON PAL TV    ( ON)
4 COLOUR            ( ON)
5 16:9              ( OFF)
6 SHOWVIEW EXTEND   (OFF)
7 LANGUAGE       (ENGLISH)

SET=1~7             END=OSP
```

3 Press **number button 2** to set "MESECAM MODE" to "ON" or "OFF".

(2)

```
SETUP
1 TAPE SELECT      (E180)
2 MESECAM MODE      (OFF)
3 NTSC ON PAL TV    ( ON)
4 COLOUR            ( ON)
5 16:9              ( OFF)
6 SHOWVIEW EXTEND   (OFF)
7 LANGUAGE       (ENGLISH)

SET=1~7             END=OSP
```

Each time you press the button, "ON" or "OFF" appears alternately.

"MESECAM MODE" setting for the recording of a TV programme

Set to "ON" or "OFF" according to the television system of a TV programme you want to record.

Television system	MESECAM MODE setting
PAL B/G (Germany, Italy, Switzerland, etc.)	(OFF)
SECAM B/G (Middle and Near East countries) SECAM D/K (Russia, Czecho, Slovakia, Hungary, etc.)	(ON)

"MESECAM MODE" setting for the playback of a tape

Set to "ON" or "OFF" according to the video system of a tape you want to play back.

Video system of a playback tape	MESECAM MODE setting
PAL tapes	(OFF)
MESECAM tapes	(ON)

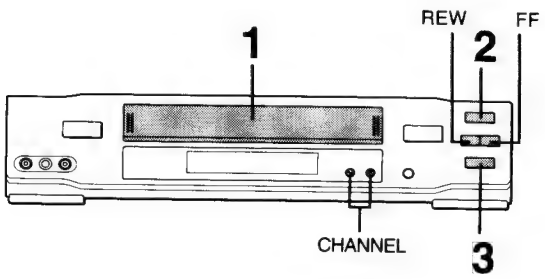
4 Press the **OSP** button twice to return to the normal TV screen.

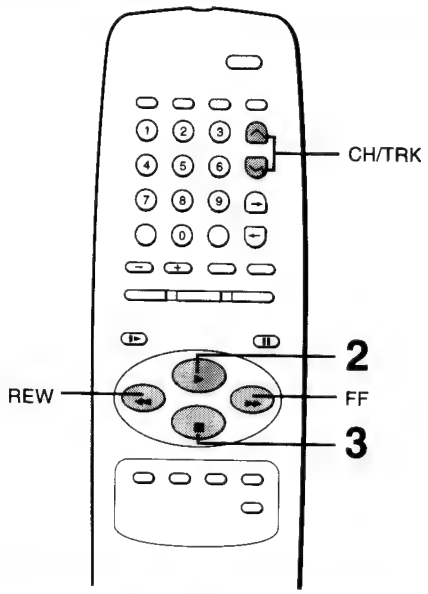
3 PLAYBACK

This section explains a basic playback operation.

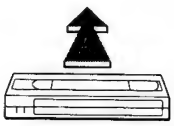
Preparation

- Select the video channel or video input mode on the TV.
- Set the video system (MESECAM MODE) properly.

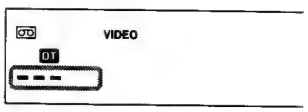




1 Load a recorded cassette.
The power is turned on.
If the cassette's safety tabs is removed, playback starts automatically.



2 Press the **PLAY** button to start playback.



3 Press the **STOP** button when playback is finished.

■ **Rewinding a video cassette tape:**
Press the **REW** button in the stop mode.

■ **Fast-forwarding a video cassette tape:**
Press the **FF** button in the stop mode.

Notes

- Televisions connected via SCART leads normally select the video input mode automatically when the PLAY button is pressed.

Adjusting the Tracking

The VTR automatically adjusts the tracking for a clear picture and sound.

■ Digital auto tracking

When playback starts, the digital auto tracking is automatically activated. (the "DT" indicator blinking)

Tracking is set when the "DT" indicator stops blinking.

Notes

- While the "DT" indicator is blinking, the playback picture and sound may be distorted.
- The digital auto tracking is activated only in the playback mode.

■ Adjusting the tracking manually

If the VTR cannot find the best possible tracking point, adjust the tracking manually.

Hold down the **CH/TRK** button until you can obtain the best possible picture and sound.

Notes

- When you want to reset the tracking point to the center, press both the ∨ and ∧ buttons at the same time.
- The noise on the screen may not be completely removed depending on the tape used, especially when the tape has been recorded on another VTR.

To return to digital auto tracking mode

Hold down simultaneously both **CHANNEL** (∨ / ∧) buttons on the front panel of the VTR for more than 1 second.

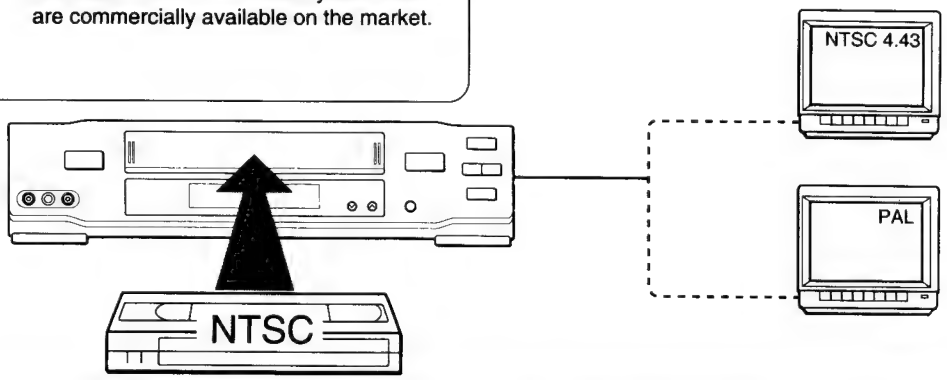
The "DT" indicator lights up.

3 NTSC-RECORDED TAPE PLAYBACK

This VTR can play back an NTSC-recorded tape. You can watch the playback picture on a PAL system TV or an NTSC 4.43 system TV.

Information

NTSC tape: Tapes on which NTSC M system broadcasts mainly transmitted in the U.S. and Japan are recorded, and tapes recorded in the NTSC video system which are commercially available on the market.

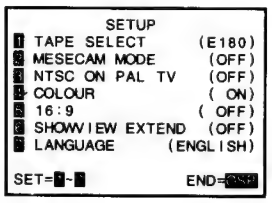


If you connect this VTR to a multi system TV (NTSC 4.43 compatible) and play back a NTSC tape

1 Press the **OSP** button.
The MENU screen will appear on the TV.

2 Press **number button 2** to select "SETUP".

3 Set "NTSC ON PAL TV" to **"OFF"** by pressing **number button 3**.



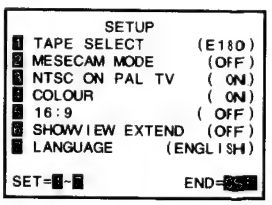
4 Press the **OSP** button twice to return to the normal TV screen.

If you connect this VTR to a PAL system TV and play back an NTSC tape

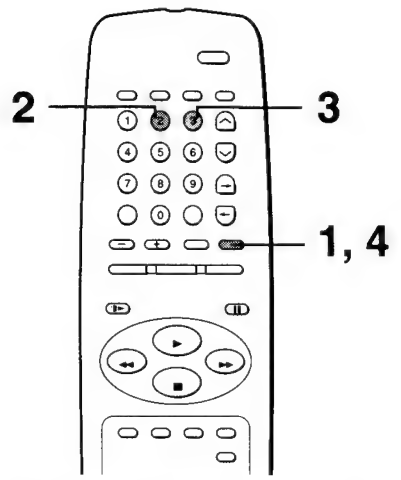
1 Press the **OSP** button.
The MENU screen will appear on the TV.

2 Press **number button 2** to select "SETUP".

3 Set "NTSC ON PAL TV" to **"ON"** by pressing **number button 3**.



4 Press the **OSP** button twice to return to the normal TV screen.



Notes for Using a PAL TV for NTSC Playback

- Use a TV compatible with PAL video signals of PAL 60 (525 lines).
  When the TV, that is not compatible with PAL video signals of PAL 60, is used (when the TV, that is compatible only with PAL video signals of PAL 50 (625 lines), is used) NTSC playback pictures may roll up and down. This is not malfunction of the VTR or the TV.

  If your TV is equipped with a V-HOLD control, it may be possible to stop the rolling of pictures by adjusting this control.

  About PAL 50 and PAL 60 of PAL video signals:
  PAL 50 : is a normal signal and its PAL video signal is 50 fields (625 lines).
  PAL 60 : is a special signal and its PAL video signal is 60 fields (525 lines).

  Some TVs operate properly only with PAL 50 signals, some TVs operate properly with both PAL 50 and 60 signals.
  Therefore, if your TV is switchable between PAL 50 (625 lines)/PAL 60 (525 lines), you can view an NTSC recorded tape in the PAL colour system with your own TV.

- Depending on the TV used, the picture may shrink vertically and black bars may appear both at the top and bottom of the TV screen.
  This is not an indication of malfunction.
- Variable speed playback (picture search, still, slow playback, etc.) may produce a skewed image and quite a bit of noise on the picture.
- If the tape pre-recorded in the SP tape speed mode is played back in the picture search mode, the picture may be reproduced with no colour.

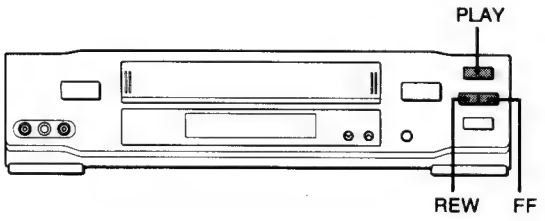
Note
For viewing an NTSC-recorded tape, we recommend using an NTSC 4.43 TV.

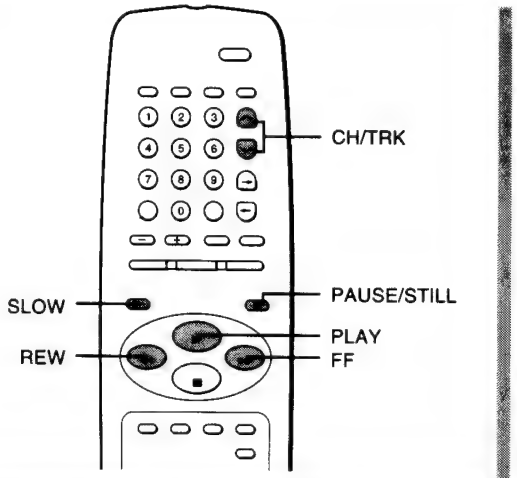
3 VARIABLE SPEED PLAYBACK

You can play back a tape at various tape speeds.

Preparation

- Select the video channel or video input mode on the TV.





Picture Search

This function allows you to quickly locate a particular scene or segment on the tape while monitoring the playback picture in the fast-forward or rewind mode.

1 During playback, press the **REW** or **FF** button.
The tape runs at 5 times the normal playback speed.

Playback ⇨ REW ◀◀ to reverse picture search
→ Picture search (5 times)
Playback ⇨ FF ▶▶ to forward picture search

2 If you hold down the **REW** or **FF** button in the picture search mode, the searching speed increases.

Hold down.
Reverse picture search (5 times) ⇨ REW ◀◀
→ Picture search (13 times)
Forward picture search (5 times) ⇨ FF ▶▶
Hold down.

- When you release the button, the searching speed returns to the 5 times searching speed.

3 To resume normal playback, press the **PLAY** button.

Notes

- The picture will have some interference. This is not a defect in the unit.
- If you press the **REW** or **FF** button while rewinding or fast-forwarding the tape, the VTR enters the picture search mode. If you press the **REW** or **FF** button while picture searching, the VTR enters the rewinding or fast-forwarding mode, respectively.

Still Picture

This function enables you to freeze a picture so that you can watch important scenes closely.

1 During playback, press the **PAUSE/STILL** button.
The picture freezes.

Playback ⇨ PAUSE/STILL ❚❚ to still picture

2 To resume normal playback, press the **PAUSE/STILL** button.

Still picture ⇨ PAUSE/STILL ❚❚ to normal playback

The still picture mode will be released automatically after approximately 5 minutes. The VTR will then shift to the normal playback mode.

Adjusting still picture stability

If the still picture is distorted or flickers, hold down the **CH/TRK** button until the picture becomes stable.

Notes

- The distortion of the still picture may not be eliminated completely if the tape has been recorded on another VTR.
- The still picture may shake if a picture of a fast-moving object or scene is frozen. This is not a defect in the unit.
- If noise appears in the still picture, adjust the tracking manually in the slow-motion picture mode.

Slow-motion Picture

This function has two variations: 1/6th and 1/12th the normal speed.

1 During playback, press the **SLOW** button.
The tape will run at about 1/6th the normal playback speed.

Playback ⇨ SLOW ▶ to 1/6 slow

2 If you press the **SLOW** button again, the tape speed changes to 1/12 slow.

1/6 slow ⇨ SLOW ▶ to 1/12 slow

Each time you press the **SLOW** button, the speed changes between 1/6 and 1/12 alternately.

3 To resume normal playback, press the **PLAY** button.

1/6 slow or
1/12 slow ⇨ PLAY ▶ to normal playback

The slow-motion picture mode will be cancelled automatically after approximately 5 minutes. The VTR will shift to the normal playback mode.

Adjusting the tracking in the slow-motion mode
If the slow-motion picture is noisy, hold down the **CH/TRK** button until the best picture is obtained.

Notes
- The slow-motion picture may flicker up and down. This is not a defect in the unit.
- The noise in the slow-motion picture may not be eliminated completely by the tracking adjustment.

Frame Advance

This function allows you to advance the picture frame by frame.

1 During playback, press the **PAUSE/STILL** button to put the VTR in the still picture mode.

Playback ⇨ PAUSE/STILL ❚❚ to still picture

2 Press the **PLAY** button.
The picture advances one frame each time you press the **PLAY** button.

Still picture ⇨ PLAY ▶ to frame advance

When the **PLAY** button is held down, the tape runs at 1/25th the normal playback speed.

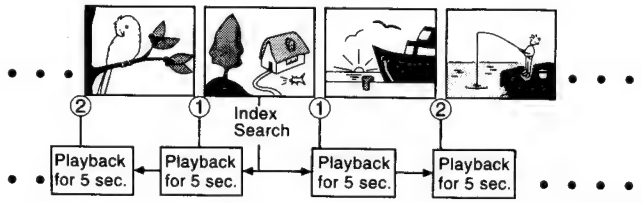
3 To resume normal playback, press the **PAUSE/STILL** button.

3 INDEX SEARCH FUNCTION

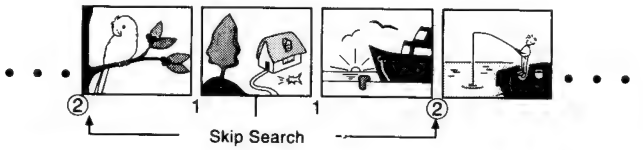
You can easily locate the desired programme using the index signal registered on the tape.

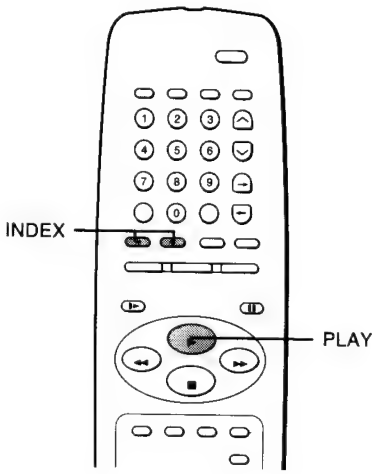
Information

Index Search: Plays back each programme with an index signal for about 5 seconds.



Skip Search: Finds and plays back a programme with an index signal you specified.





Registering Index Signals Automatically

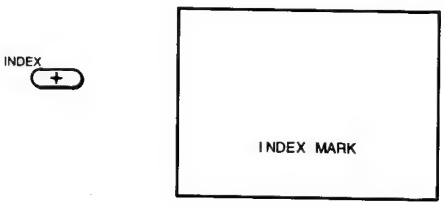
An index signal is automatically registered **when a recording starts.**
An index signal is also registered when timer programme recording starts.

Note
An index signal is not registered automatically when the VTR is in the recording pause mode and recording restarts.

Registering Index Signals Manually

During recording, index signals can be manually registered at desired points on the tape.

Press the **INDEX** (+) button at a desired point.



Note
When registering two or more index signals, certain intervals are required more than 1 minute.

Slow-motion Picture

This function has two variations: 1/6th and 1/12th the normal speed.

1 During playback, press the **SLOW** button.
The tape will run at about 1/6th the normal playback speed.

Playback ⇨ SLOW ▶ to 1/6 slow

2 If you press the **SLOW** button again, the tape speed changes to 1/12 slow.

1/6 slow ⇨ SLOW ▶ to 1/12 slow

Each time you press the **SLOW** button, the speed changes between 1/6 and 1/12 alternately.

3 To resume normal playback, press the **PLAY** button.

1/6 slow or
1/12 slow ⇨ PLAY ▶ to normal playback

The slow-motion picture mode will be cancelled automatically after approximately 5 minutes. The VTR will shift to the normal playback mode.

Adjusting the tracking in the slow-motion mode
If the slow-motion picture is noisy, hold down the **CH/TRK** button until the best picture is obtained.

Notes
- The slow-motion picture may flicker up and down. This is not a defect in the unit.
- The noise in the slow-motion picture may not be eliminated completely by the tracking adjustment.

Frame Advance

This function allows you to advance the picture frame by frame.

1 During playback, press the **PAUSE/STILL** button to put the VTR in the still picture mode.

Playback ⇨ PAUSE/STILL ❚❚ to still picture

2 Press the **PLAY** button.
The picture advances one frame each time you press the **PLAY** button.

Still picture ⇨ PLAY ▶ to frame advance

When the **PLAY** button is held down, the tape runs at 1/25th the normal playback speed.

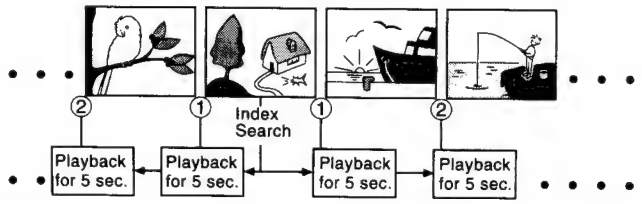
3 To resume normal playback, press the **PAUSE/STILL** button.

3 INDEX SEARCH FUNCTION

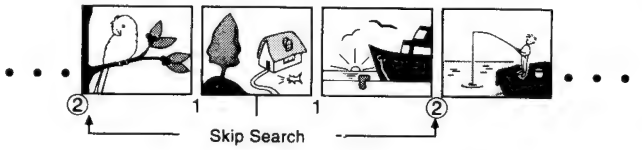
You can easily locate the desired programme using the index signal registered on the tape.

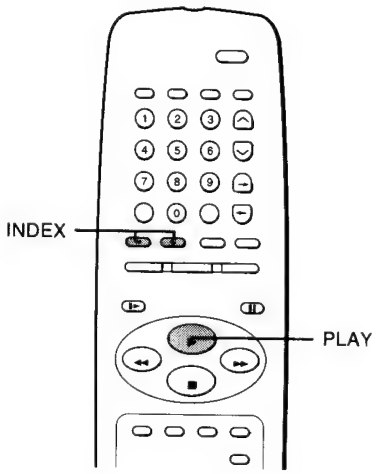
Information

Index Search: Plays back each programme with an index signal for about 5 seconds.



Skip Search: Finds and plays back a programme with an index signal you specified.





Registering Index Signals Automatically

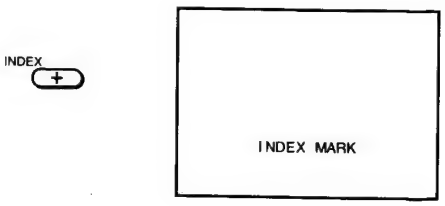
An index signal is automatically registered **when a recording starts.**
An index signal is also registered when timer programme recording starts.

Note
An index signal is not registered automatically when the VTR is in the recording pause mode and recording restarts.

Registering Index Signals Manually

During recording, index signals can be manually registered at desired points on the tape.

Press the **INDEX** (+) button at a desired point.



Note
When registering two or more index signals, certain intervals are required more than 1 minute.

Index Search

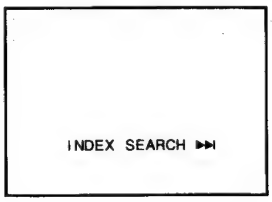
This function plays back the tape for about 5 seconds at each index signal.

1 Load a cassette with the index signals registered.

2 Press the **INDEX** (–) or (+) button while in the stop or playback mode.

INDEX (–) : to search in the reverse direction

INDEX (+) : to search in the forward direction



The VTR fast-forwards or rewinds the tape. When an index signal is found, the VTR plays back the tape for about 5 seconds, and then resumes fast-forwarding or rewinding. This operation is repeated at each index signal.

3 Press the **PLAY** button when the desired programme is found.
Normal playback starts.

PLAY ▶

Notes
- At the very beginning of the tape, the index search function may not work correctly.
- If you registered the index signals on a tape recorded on another VTR, the recording may be blurred at the index point and the index search may not work correctly.

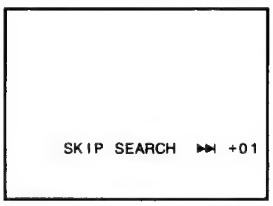
Skip Search

This function fast-forwards or rewinds the tape to the point at which the selected index signal is registered, and starts playback from there.

1 Load a cassette with the index signals registered.

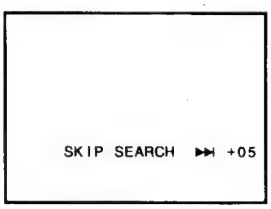
2 Press the **INDEX** (–) or (+) button twice in the stop or playback mode.

INDEX (–) (+)



3 Press the **INDEX** (–) or (+) button depending on the direction where your desired programme is located. Each time you press the (–) or (+) button, the number decreases or increases respectively.

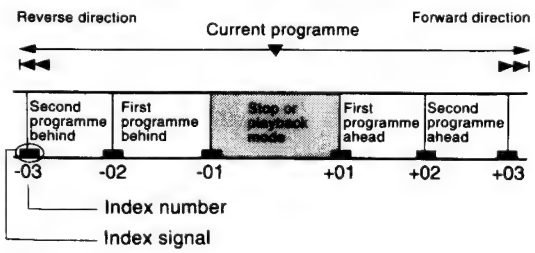
INDEX (–) (+)



The VTR starts to search for the point you specified with the (–) or (+) button. When the point is found, playback will start automatically.

Notes
- You can set an index number up to ±20.
- The skip search is cancelled when the PLAY or STOP button is pressed.

Locating the index number



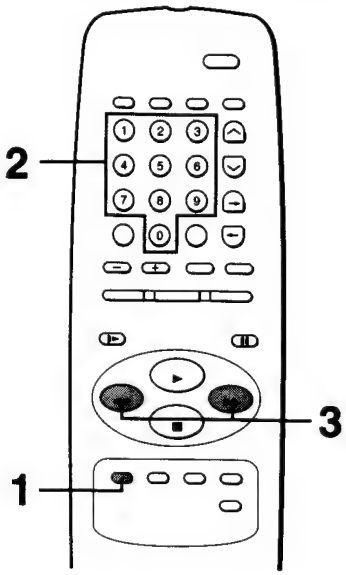
[Example]
- To locate the beginning of first programme behind, press the **INDEX** (–) button three times to set the index number -02.
- To locate the beginning of next programme ahead, press the **INDEX** (+) button twice to set the index number +01.

3 TIME SEARCH FUNCTION

The VTR fast-forwards or rewinds the tape by an amount of time you specified.

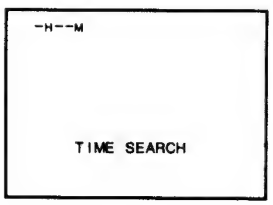
Preparation

- Turn on the VTR.
- Select the video channel or video input mode on the TV.

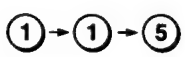


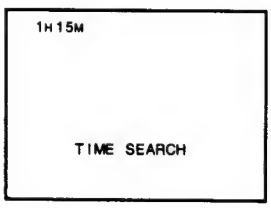
Example **to move tape ahead 1 hour and 15 minutes**

1 Press the **T. SEARCH** button in the stop mode or playback mode.



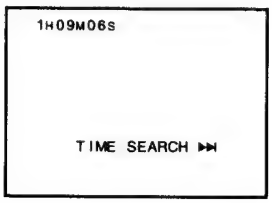
2 Within 10 seconds, press **number buttons** to set the hours and minutes.





To set less than one hour, put 0 for the hours.

3 Press the **FF** or **REW** button within 10 seconds. Time search starts.



Notes

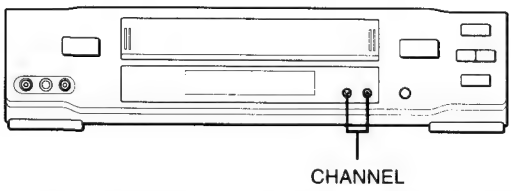
- If you make a time search in the playback mode, playback will start after the search is completed.
- The displayed time is approximation.

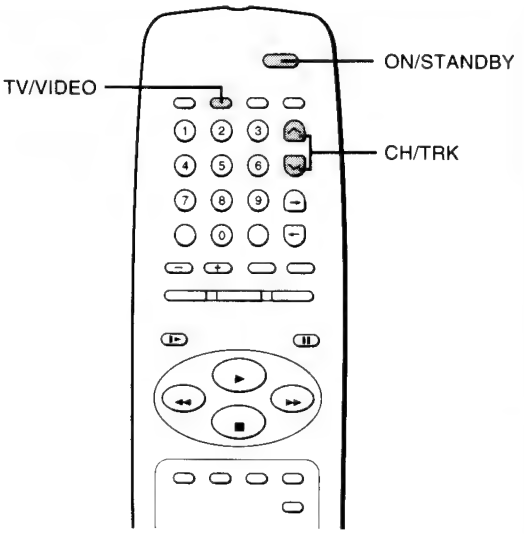
3 TV VIEWING

Three types of normal TV viewing are possible when the VTR is connected to a TV.

Preparation

Make sure that the VTR is connected to your TV using the connection method.





Using the VTR Tuner

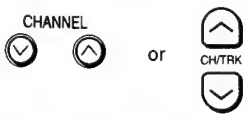
1 Press the **ON/STANDBY** button to turn the VTR on.

2 Turn on the TV and select the video channel or video input mode depending on the TV connection method.

Video channel or video input mode

3 Press the **TV/VIDEO** button so that the "VIDEO" indicator appears in the VTR display.

4 Press the **CHANNEL** (∨ / ∧) button on the front panel of the VTR, or press the **CH/TRK** button on the remote controller to select a TV programme you want to watch.



Using the TV Tuner

1 Turn on the TV.

2 Choose a TV programme you want to watch, using the station selector on the TV.

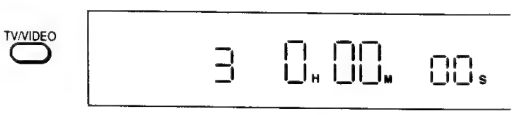
Station selector on the TV

It is not necessary to turn on the VTR in this case. The VTR needs to be plugged in an AC outlet.

Using the TV Tuner While the VTR is Turned on

1 Turn on the TV and the VTR.

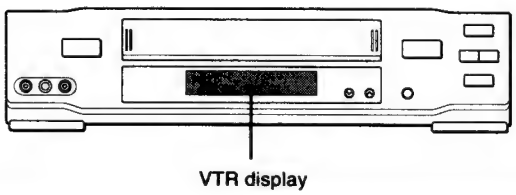
2 Turn off the "VIDEO" indicator by pressing the **TV/VIDEO** button.

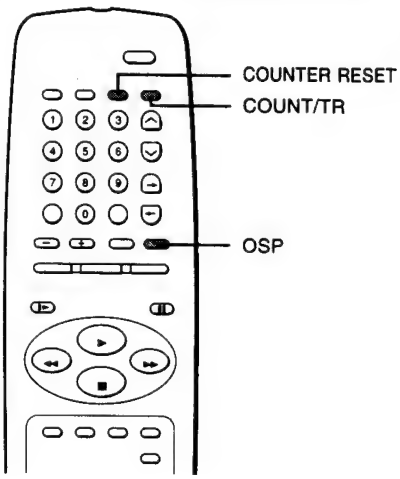


3 Choose a TV programme you want to watch, using the station selector on the TV.

3 COUNTER FUNCTION

You can see the clock, linear tape counter or tape time remaining in the VTR display.





Changing the Counter Display

Each time you press the **COUNT/TR** button, the display changes in sequence as follows:

Linear time counter	VTR display 1:25:00 hour minutes seconds
Tape time remaining	1:30
Clock	15:30
Linear time counter	Linear time counter

To reset the linear time counter to "0H00M00S"

The counter is automatically reset to "0H00M00S" when a cassette is ejected. If you want to reset the counter at some other point, for example, when you start a new recording, just press the **COUNTER RESET** button.

Notes

- The linear time counter does not work on non-recorded portions of the tape.
- When the tape is ejected or the VTR is turned off, the linear time counter changes to clock display.
- If the tape rewinds back over "0H00M00S", "—" appears in the VTR display.
- The displayed time of the linear time counter is approximation.

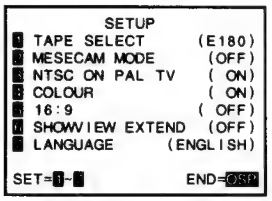
Tape Time Remaining

1 Turn on the VTR and load a cassette.

2 Press the **OSP** button.
The MENU screen will appear on the TV.

3 Press **number button 2** to select "SETUP".

②



4 Press **number button 1** and select a tape length, E180, 240, 260 or 300 depending on the tape to be used.
Each time you press **number button 1,** the tape length changes.

① E180: when using an E-195 tape or shorter.
E240: when using an E-210 or E-240 tape.
E260: when using an E-260 tape.
E300: when using an E-300 tape.

5 Press the **OSP** button to return to the normal TV screen.

6 Press the **COUNT/TR** button.
The tape time remaining is displayed.

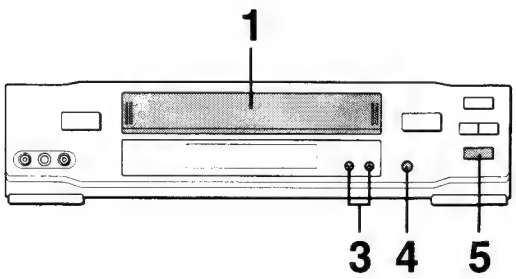
Notes
- The displayed time remaining is an approximation.
- The time remaining is calculated according to the cassette type.
- It is necessary to set the tape length correctly beforehand in step 4 when you use the time remaining display.

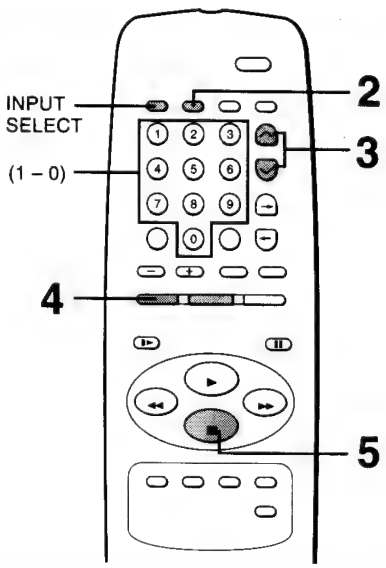
4 RECORDING A TV PROGRAMME

This section explains a basic recording operation.

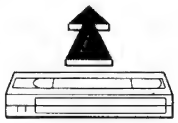
Preparation

- Turn on the VTR.
- Select the video channel or video input mode on the TV.
- Set the video system (MESECAM MODE) properly.

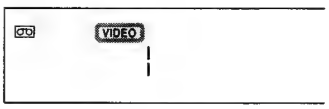




1 Load a cassette with the safety tab attached.

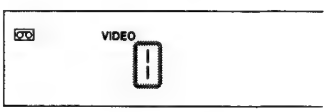


2 Press the **TV/VIDEO** button so that the "VIDEO" indicator appears in the VTR display.



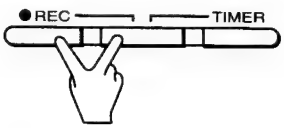
3 Select the TV programme (position number) to record with the **CH/TRK** buttons, or **number buttons (1 – 0)** on the remote controller.

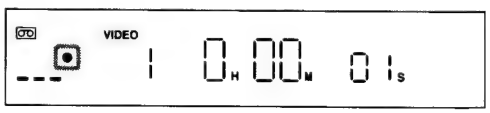
Example : recording a programme of a station stored in position 1



If you find "L1", "L2" or "SA" in the position number area, press the **INPUT SELECT** button so that the position number appears instead.

4 Press the **REC** button on the VTR, or simultaneously press the two **REC** buttons on the remote controller. Recording starts.





5 Press the **STOP** button when recording is finished.

■ Skipping unnecessary scenes while recording

1) Press the **PAUSE/STILL** button while recording. Recording stops briefly.

2) Press the **PAUSE/STILL** button again to restart recording.

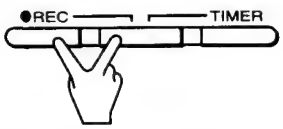
■ Changing the recording programme while recording

1) Press the **PAUSE/STILL** button while recording. Recording stops briefly.
2) Select another TV programme (position number) with **CH/TRK** buttons or **number buttons (1 – 0)**.
3) Press the **PAUSE/STILL** button again to restart recording.

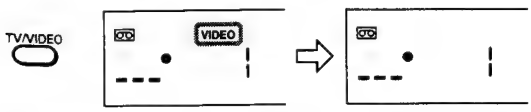
Note
The VTR automatically shifts to the stop mode if the recording pause mode continues for 10 minutes.

Watching Another TV Programme While Recording

1) Record a TV programme.



2) Press the **TV/VIDEO** button so that the "VIDEO" indicator disappears in the VTR display.



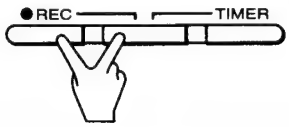
3) While recording, choose another TV programme using the station selector on the TV.

Note
To monitor the programme which is being recorded, press the TV/VIDEO button again so that the "VIDEO" indicator will appear in the VTR display. Select the video channel or video input mode on the TV.

One-touch Timer Recording

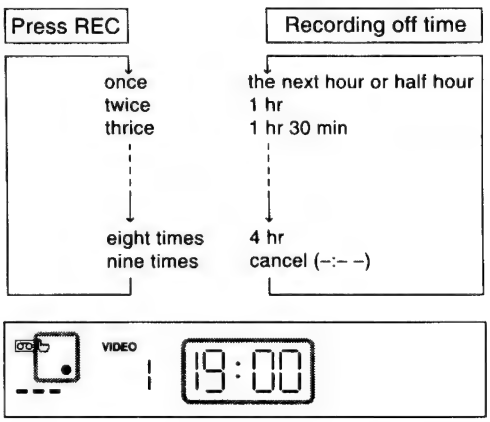
While recording, you can set its end time.

1) Record a TV programme.



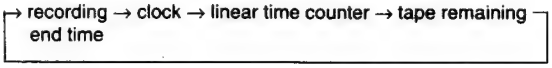
2) Press the **REC** button **on the VTR** to set the recording end time.

Each press of the button changes the end time as folows:



At the recording end time you set, the recording stops and the VTR is turned off automatically.

Notes
- To cancel the one-touch timer recording in progress, press the STOP button.
- To delay the recording end time, further press the REC button on the VTR.
- If the VTR clock is not set, the one-touch timer recording is not activated.
- If the COUNT/TR button is pressed in the one-touch timer recording mode, the VTR display changes as below.

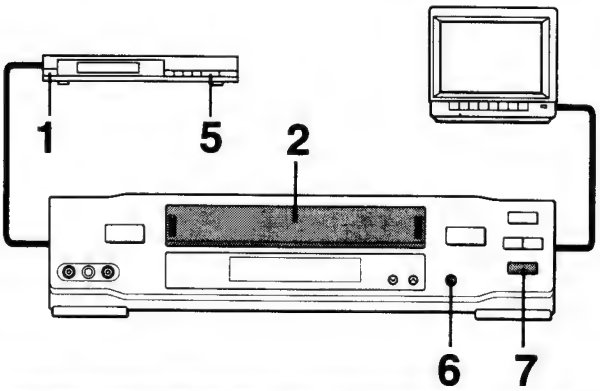


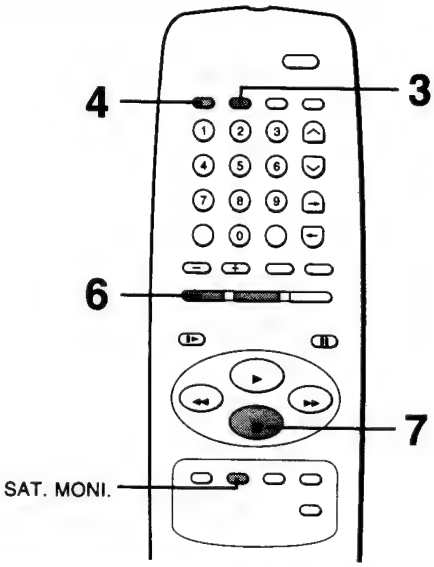
4 RECORDING FROM A SATELLITE RECEIVER

If you are using a satellite receiver, you can connect it to this VTR to record a satellite programme.

Preparation

- Turn on the VTR.
- Select the video channel or video input mode on the TV.
- Make sure your satellite receiver is connected to the VTR correctly.





1 Turn on the connected satellite receiver.

2 Load a cassette with the safety tab attached.

3 Press the **TV/VIDEO** button so that the "VIDEO" indicator will appear in the VTR display.

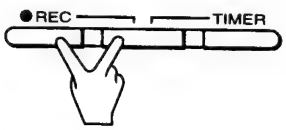
4 Press the **INPUT SELECT** button so that "SA" will appear in the position number area.

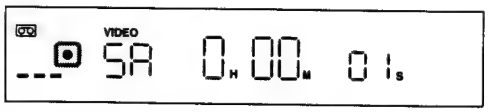
Each time you press the **INPUT SELECT** button, the display changes as shown below.

→ TV (position number) → L 1→ L 2→ SA (satellite) ┐

5 Choose the satellite programme you want to record using the station selector on the connected satellite receiver.
Make sure that selected programme is on the TV screen.

6 Press the **REC** button on the VTR, or simultaneously press the two **REC** buttons on the remote controller.
Recording starts.





7 Press the **STOP** button when recording is finished.

Satellite Monitor Function

You can watch a satellite programme from your connected satellite receiver even while the VTR is recording a TV programme, or is in the playback or stop mode.

Preparation

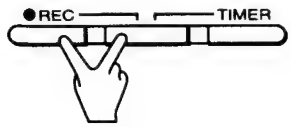
Make sure that the satellite receiver, the TV and the antenna are connected properly, using the diagram "CONNECTION TO A SATELLITE RECEIVER/ PREMIERE-DECODER".

Important

This function only applies when the TV and the satellite receiver are connected to the VTR using the SCART socket.

■ WATCHING A SATELLITE PROGRAMME WHILE RECORDING A TV PROGRAMME

1) Follow steps 1 to 4 of "RECORDING A TV PROGRAMME" and record a TV programme.



2) Press the **SAT. MONI.** button.
The "MONI" indicator appears.

Each time you press the **SAT. MONI.** button, the "MONI" indicator goes on and off.

3) Choose the satellite programme you want to watch on the connected satellite receiver.

■ WATCHING A SATELLITE PROGRAMME WHILE THE VTR IS IN THE PLAYBACK OR STOP MODE

1) Press the **SAT. MONI.** button so that the "MONI" indicator will appear in the VTR display.

2) Press the **TV/VIDEO** button so that the "VIDEO" indicator will appear in the VTR display.

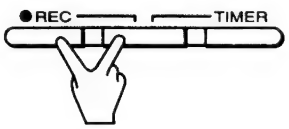
3) Choose the satellite programme you want to watch on the connected satellite receiver.

Notes

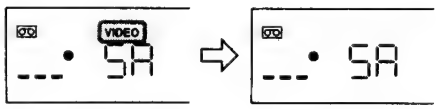
- When OSP mode (ex. the MENU screen is displayed) is set, the satellite monitor function is cancelled.
- The satellite monitor function is also available in the timer programme recording mode, the timer standby mode, or the one-touch timer recording mode.

■ WATCHING A TV PROGRAMME WHILE RECORDING A SATELLITE PROGRAMME

1) Follow steps 1 to 6 of "RECORDING FROM A SATELLITE RECEIVER", and record a satellite programme.



2) Press the **TV/VIDEO** button so that the "VIDEO" indicator disappears in the VTR display.



3) Choose a TV programme you want to watch on your TV handset while recording a satellite programme.

4 SHOWVIEW

This VTR is equipped with the SHOWVIEW programming system. This system allows you to set up easily for unattended recording.

Information

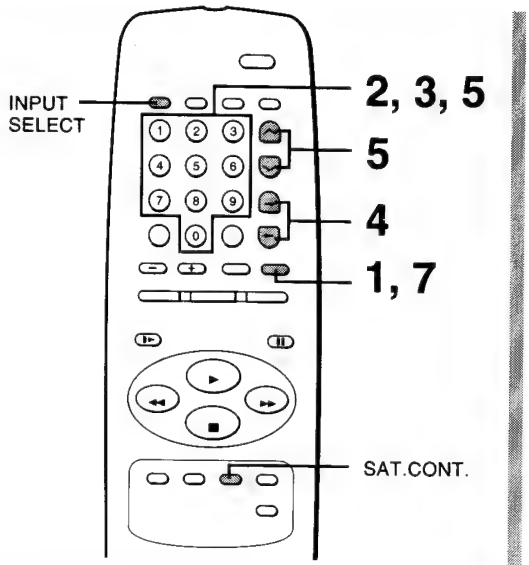
Before making a SHOWVIEW recording, it is necessary to set GUIDE channels to the VTR.
The SHOWIVEW recording procedure will be explained.

Preparation

- Select the video channel or video input mode on the TV.
- Turn on the VTR.

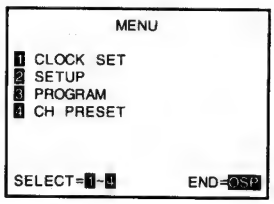
Note

The recording systems below are also available on this VTR other than the SHOWVIEW recording.
- One-touch timer recording
- Timer programme recording

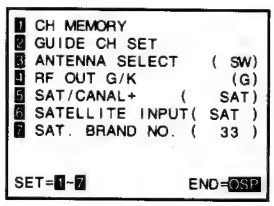


GUIDE Channel Setting

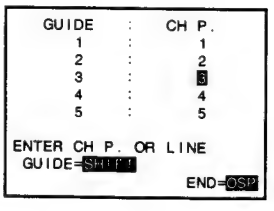
1 Press the **OSP** button.



2 Press **number button 4**.



3 Press **number button 2**.

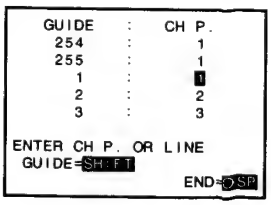


4 Press the **SHIFT** buttons to select a "GUIDE" according to the list you prepared.

TV stations	GUIDE channel	Position number in which the TV station has been memorized on the VTR
ex. XXX	ex. 001	ex. 1

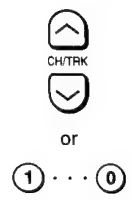
Enter the number allocated to each TV station looking up TV magazines, etc.

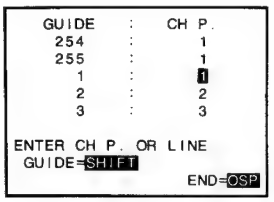
Example : to set a GUIDE channel for the TV station with 001 GUIDE channel allocated.



5 Enter the position numbers (1 to 48) in which you have stored TV stations on the VTR, in the "CH P." column.

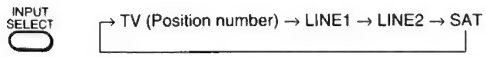
Example : For a TV station which you have stored in position 1, enter 1 in the "CH P." column by using the **CH/TRK** or **number buttons**.





Only in case you want to record programmes from connected external equipment such as a satellite receiver, proceed to the following.
If not, skip to step 6.

Press the **INPUT SELECT** button so that "LINE1", "LINE2" or "SAT" will appear for the position number on the TV screen.



Select either according to the connection.
LINE1: to record programmes received on external equipment connected via the AUDIO/VIDEO (SCART) socket on the rear panel.
LINE2: to record programmes received on external equipment connected via the LINE IN 2 (AUDIO/VIDEO) jacks on the front panel.
SAT: to record satellite programmes received on the satellite receiver connected via the SAT./DECODER (SCART) socket.
Select a desired satellite station using the station selector on the satellite receiver when you make a SHOWVIEW recording.

6 To set GUIDE channels for other TV stations, follow steps 4 and 5.

7 Press the **OSP** button three times, to return to normal TV screen.
GUIDE channel setting is all completed.

Your SHOWVIEW programming is now ready to use.

GUIDE Channel Setting For Satellite Receiver Control

To make a SHOWVIEW recording of satellite programmes from the connected satellite receiver, the procedure below is also available. If you use this setting, the VTR can automatically change satellite stations as you have set in the SHOWVIEW recording mode.

1) In step 5, enter the station number of a desired satellite station in the "CH P." column by pressing first the SAT. CONT. button (SA displayed), and then number buttons.

2) Perform steps 6 and 7.

Important

To use this function, make the procedures for the "SATELLITE RECEIVER CONTROL".

4 SHOWVIEW

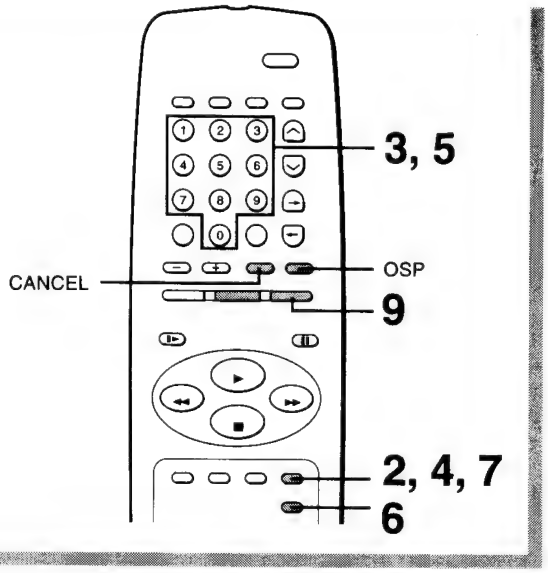
After having setting GUIDE channels, you can perform SHOWVIEW recording using the SHOWVIEW numbers.

Information

You can perform timer recording very easily using the SHOWVIEW programming system of this VTR.
You simply enter SHOWVIEW numbers carried on the daily newspapers or TV directories.

Preparation

- Make sure that the clock is set correctly.
- If you record from a satellite receiver or a PREMIERE-decoder, make sure that the connection and the setting are made correctly.
- Set the video system (MESECAM MODE) properly.



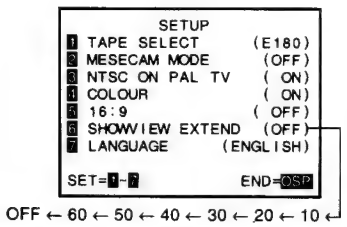
Setting Time Extension

Before making a SHOWVIEW recording, set possible time extension for the recording to allow for programme's overrunning. You can extend the recording time in 10 minute increments up to 60 minutes.

1) Press the **OSP** button.
The MENU screen appears on the TV.

2) Press **number button 2** to select "SETUP".

3) Press **number button 6** repeatedly to set desired time extension.



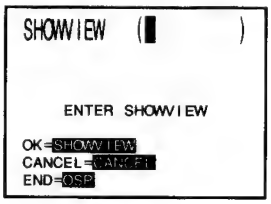
Notes

- Extend time should be set before starting SHOWVIEW recording procedure.
  The time extending doesn't work on recording programmes already memorized.
- When you do not use time extension for SHOWVIEW recording, set to "OFF" on the SETUP screen.

SHOWVIEW Recording Procedure

1 Load a cassette with the safety tab attached.

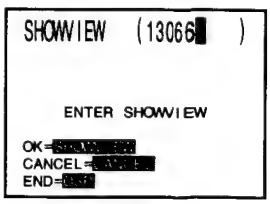
2 Press the **SHOWVIEW** button.
The VTR enters the SHOWVIEW mode.



3 Enter the SHOWVIEW number (allocated to each TV programme carried on TV magazines).

Example : to record a TV programme beginning at 20:30 on 8, October, 1994 with SHOWVIEW number 13066 (fiction).

Press **number button 1, 3, 0, 6 and 6**.
Confirm that the entered number is correct.

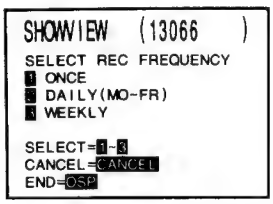


Correcting a mistake

- Press the CANCEL button. The current SHOWVIEW number is cleared.
- Re-enter a correct SHOWVIEW number.

4 Press the **SHOWVIEW** button.
The TV screen changes as follows:
(Some TV programmes may not require the selection on the screen below, and skip automatically to step 6 when its SHOWVIEW number is entered.)

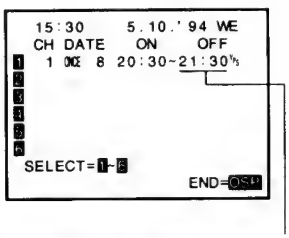
SHOWVIEW



ONCE: one-time recording.
DAILY (MO~FR): records TV programmes on the same TV station at the same time Monday through Friday.
WEEKLY: records TV programmes on the same TV station at the same time on the same day every week.

5 To select "ONCE" for example, press **number button 1**.
The "ONCE" programming has been made automatically.
Programme details are shown.

①



ex. When you set 10 minutes time extension on the SETUP screen, the "OFF" displays 21:40.

6 If you are using the VPS function, check to be sure "VPS" is on.
Each time you press the **VPS** button, "VPS" turns on or off.

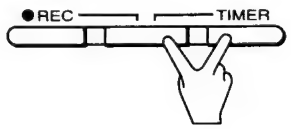
VPS

7 Press the **SHOWVIEW** button.
Programme setting is now memorized.

SHOWVIEW

8 To enter other SHOWVIEW numbers, follow steps 2 to 7.

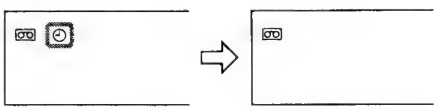
9 Finally press the two **TIMER** buttons simultaneously.
The VTR enters the timer standby mode and ⏲ indicator lights up.



Recording or Playback in the Timer Standby Mode

When you want to use the VTR while it is set to the timer standby mode, proceed as follows:

1) Press the **TIMER** buttons simultaneously.
⏲ indicator goes off.



2) Press the **ON/STANDBY** button to turn on the VTR and operate the VTR as usual.

3) After operating the VTR, press the **TIMER** buttons.
The VTR returns to the timer standby mode.

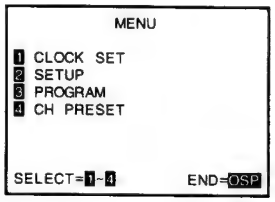
> Finish normal use of the VTR before the preset recording start time, since the timer only works when the VTR is in the timer standby mode.

4 SHOWVIEW

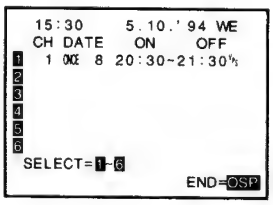
Confirming the SHOWVIEW Timer Programmes

■ **To confirm the SHOWVIEW recording programme before the VTR enters the timer standby mode (⏲ indicator not lit)**

1) Press the **OSP** button.



2) Press **number button 3**.

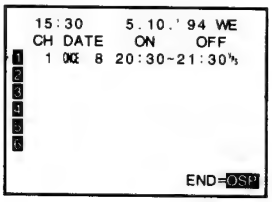


Check your programme data.

3) Press the **OSP** button twice.
The TV screen returns to the normal screen.

■ **To confirm during the timer programme recording (⏲ indicator lit)**

Press the **OSP** button so that the screen for confirming appears. After about 30 seconds, the screen disappears.



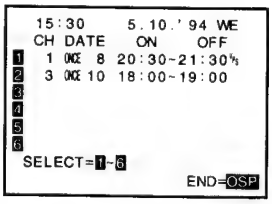
Cancelling the SHOWVIEW Timer Programmes

Preparation

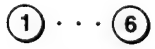
If the VTR is set to the timer standby mode, (⏲ indicator lit), press the TIMER buttons to release it and press the ON/STANDBY button.

1) Press the **OSP** button to display the MENU screen.

2) Press **number button 3**.



3) Select a programme number which you want to cancel by using number buttons.



4) Press the **CANCEL** button.
The selected programme data is cancelled.

5) Press the **OSP** button.

6) If necessary, press the **TIMER** buttons to return to the timer standby mode.

Changing the SHOWVIEW timer programmes

Preparation

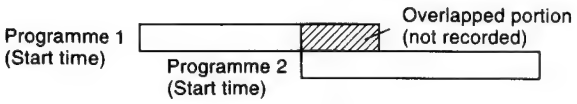
First cancel the timer programme. (See "Cancelling the SHOWVIEW Timer Programmes".)

1) Press the **SHOWVIEW** button so that the SHOWVIEW screen appears.
Enter a new SHOWVIEW number.

2) Press the two **TIMER** buttons simultaneously to enter the timer standby mode.

Overlaps the programme
If two programmes overlap, the recording start time of programme 2 has a priority over the recording end time of programme 1.

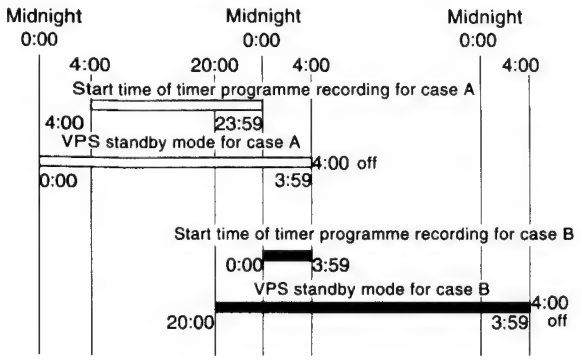
Example: when programme 2 overlaps programme 1.



■ **VPS (Video Programme System)**
When you make a programme for the VPS timer recording, the VTR will switch to the VPS standby mode. The switch on time of the VPS standby mode depends on the start time of the VPS programme which has to be entered. Moreover, there are two types of VPS standby modes as follows:

Case A: the time between 4:00 and 23:59
Case B: the time between 0:00 and 3:59

The illustration shown below indicates when both the VPS modes will be switched on and off.



Error indicators
When the "FULL (CLEAR PROG.)" message appears on the TV during programming, no more programmes can be entered. If you want to add another programme, delete one existing programme on the screen by using number button.

If impossible SHOWVIEW number is entered, "INVALID CODE ENTERED" blinks on the screen to tell you that the recording cannot be performed. Press the CANCEL button to clear the SHOWVIEW number and enter correct one.

If "CLASH" message appears on the screen during programming, it tells you that two programmes with the same recording start time have been entered. You have to make a correction. On this screen, blinking item number means that the item has been entered later.

1) Press **a number button** corresponding to the item to be cancelled and then press the **CANCEL** button. The selected item has been cleared.
2) Press the **SHOWVIEW** button.
   - If the SHOWVIEW screen appears:
     Confirm the programme on the screen and press the **SHOWVIEW** button.
     The programme is memorized and the normal screen appears.
   - If the normal screen appears:
     It means that your programme has been already memorized. No need to make a further setting.

4 TIMER PROGRAMME RECORDING

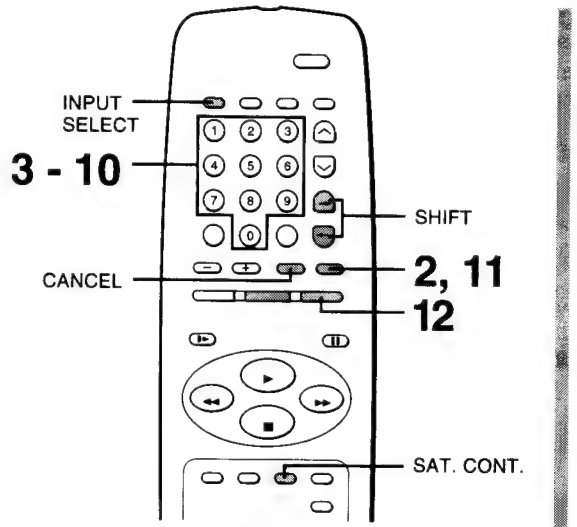
The programmable timer allows you to record up to 6 different programmes over one month. This function is convenient when you are away from home or when you are busy.

Information

The item to be set blinks. Set the data with the number buttons, following the blinking position.
You can change the blinking position by pressing the SHIFT (→/←) buttons.

Preparation

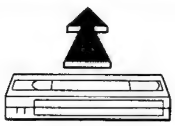
- Turn on the VTR.
- Select the video channel or video input mode on the TV.
- Make sure that the clock is set correctly.
- Set the video system (MESECAM MODE) properly.



Example

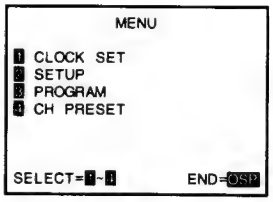
to record a programme of a station with TV channel number 26 stored on position number 1 from 20:30 until 21:30 on October 8. Today is October 5.

1 Load a cassette with the safety tab attached.



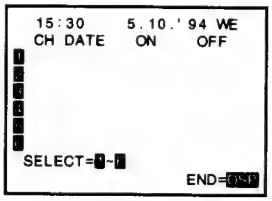
2 Press the **OSP** button.

OSP



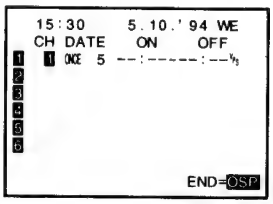
3 Press **number button 3.**

③

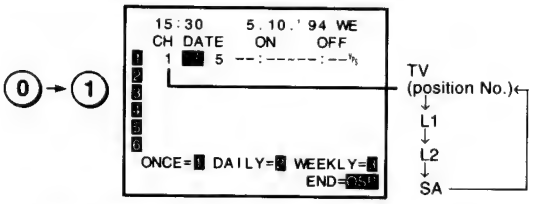


4 Select programme number 1.

①



5 Select position number 1.
Press **number button 0 and 1.**



You can make a timer programme recording of a source programme from other equipment connected to this VTR using the **INPUT SELECT** button.

- L1 : to record from other equipment connected to the AUDIO/VIDEO (SCART) socket on the rear panel of this VTR.
- L2 : to record from other equipment connected to the LINE IN 2 jacks on the front panel of this VTR.
- SA : to record from the satellite receiver connected to the SAT./DECODER (SCART) socket on the rear panel of this VTR.

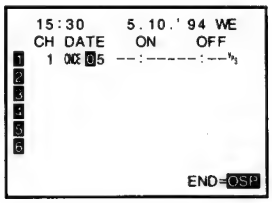
If you press the **SAT. CONT.** button, the VTR enters the satellite receiver control mode and "SA" is displayed. Enter a desired satellite station.

SAT.CONT. → ex. ①→②

Correcting a mistake
Press the SHIFT (←) button to reverse the blinking position until the number you set incorrectly blinks. Correct the number with the number buttons and press the SHIFT (→) button to return the blinking digit.

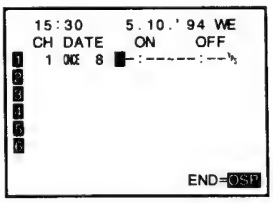
6 Select a one-time recording.
You can also set daily and weekly timer recordings.

①



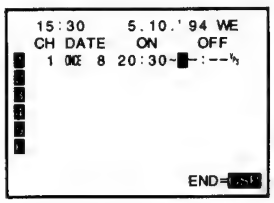
7 Set the recording date.

0 → 8



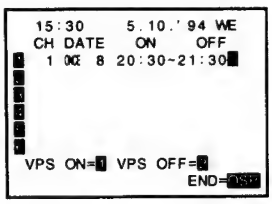
8 Set the hours and minutes of the recording start time.

2 → 0 → 3 → 0



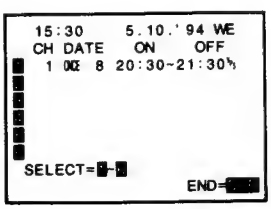
9 Set the hours and minutes of recording end time.

2 → 1 → 3 → 0



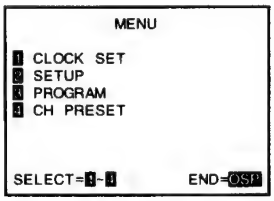
10 To set VPS, press **number button 1**. (If you want to set the normal timer recording without VPS, press number button 2.)
If you have set the VTR to the satellite control mode (SA displayed) in step 5, VPS cannot be set.

①

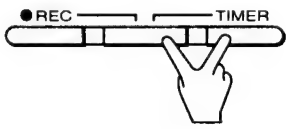


To set another programme, follow steps 4 to 10. (For this example, since programme number 1 is already used, set another programme using programme numbers 2, 3 . . 6 in step 4.)

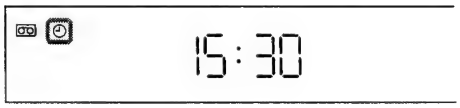
11 Press the **OSP** button.
Programme setting is completed.



12 Press the two **TIMER** buttons simultaneously.



The power will be turned off and the VTR enters the timer standby mode.

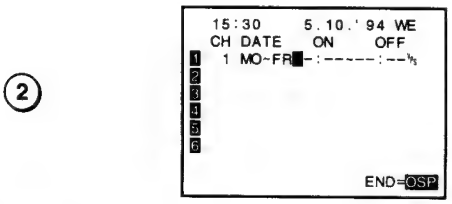


4 TIMER PROGRAMME RECORDING

Daily and Weekly Recording

■ **Daily timer programme recording**
You can record TV programmes on the same TV station at the same hour Monday through Friday.

1) In step 6, press **number button 2** to select "DAILY".

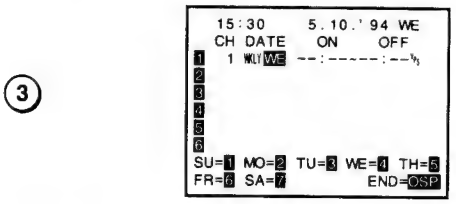


2) Skip step 7.

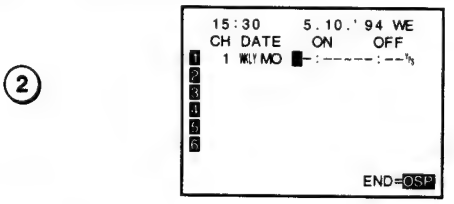
3) Perform steps 8 to 12.

■ **Weekly timer programme recording**
You can record TV programmes on the same TV station on the same day every week.

1) In step 6, press **number button 3** to select "WEEKLY".



2) Press **number button 1 to 7** to select the day of the week.
For example, if you press **number button 2** to select "MO", you can record the programme on the same TV station on the same time every Monday.



3) Skip step 7.

4) Perform steps 8 to 12.

Confirming the Timer Programmes

To confirm during the timer programme recording (◴ indicator lit)
Press the **OSP** button so that the screen for confirming appears. After about 30 seconds, the screen disappears.

Changing the Timer Programme

Preparation
If the VTR is set to the timer standby mode (◴ indicator lit), press the TIMER buttons to release it and press the ON/STANDBY button.

1) Perform step 2 to 12 of the timer programme setting procedure, to correct timer programme data.
   • In step 4, select a programme number which you want to correct.

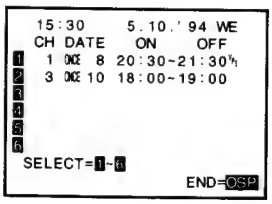
2) Press the **TIMER** buttons simultaneously to return the VTR to the timer standby mode.

Cancelling the Timer Programmes

Preparation
If the VTR is set to the timer standby mode (◴ indicator lit), press the TIMER buttons to release it and press the ON/STANDBY button.

1) Press the **OSP** button to display the MENU screen.

2) Press **number button 3**.



3) Select a programme number which you want to cancel by using number buttons.

(1) · · · (6)

4) Press the **CANCEL** button.
The selected programme data is cancelled.

CANCEL

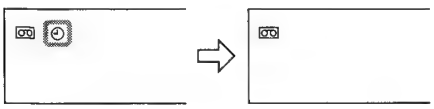
5) Press the **OSP** button.

6) If necessary, press the **TIMER** buttons to return to the timer standby mode.

Recording or Playback in the Timer Standby Mode

When you want to use the VTR while it is set to the timer standby mode, proceed as follows:

1) Press the **TIMER** buttons simultaneously.
   ⏲ indicator goes off.



2) Press the **ON/STANDBY** button to turn on the VTR and operate the VTR as usual.

3) After operating the VTR, press the **TIMER** buttons.
   The VTR returns to the timer standby mode.

> Finish normal use of the VTR before the preset recording start time, since the timer only works when the VTR is in the timer standby mode.

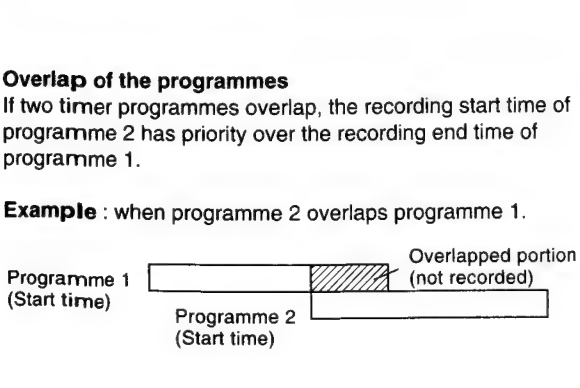
Additional Information

Error indicator
The "E" (error) indicator appears in the VTR display if you press the TIMER buttons when:
— a cassette is not loaded.
— a cassette without a safety tab is loaded.
— a cassette with a safety tab is loaded and no timer programmes are set on the VTR.
In these cases, a recording will not be made.

If a power failure occurs during timer programme recording
- After a power failure of short duration, the colon between the hour and minute digits blinks in the VTR display. This indicates that the timer programmes are still in the memory of the VTR.
- After a power failure of long duration, "0:00" blinks in the VTR display. This indicates that the timer programmes have been cleared. Reset the clock and timer programmes on the VTR.

Overlap of the programmes
If two timer programmes overlap, the recording start time of programme 2 has priority over the recording end time of programme 1.

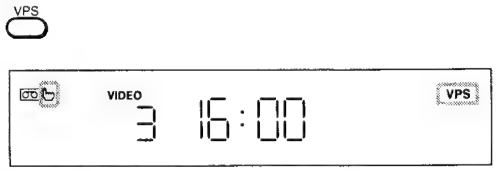
Example : when programme 2 overlaps programme 1.



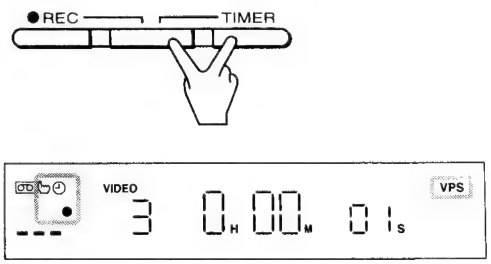
One-touch Timer Recording with VPS

This VTR can perform recordings of a TV programme with VPS signals. Using the VPS system, the VTR recognizes a change of time of the programme. After the recording, the VTR automatically turns off.

1 Press the **VPS** button on the remote controller while recording, or in the recording pause or the stop mode ("VPS" indicator lit).



2 Within 10 seconds, press the two **TIMER** buttons simultaneously.
VPS recording starts.



The VPS system sets the switch off time automatically.

Notes
- If there are not VPS signals sent, the automatic VPS turn-off function will not work. In this case, the "E" indicator will appear in the VTR display.
- When the recording ends, the VTR automatically turns off (standby mode).
- To cancel the VPS function, press the two TIMER buttons.

4 SATELLITE RECEIVER CONTROL

The VTR can directly control station selecting of the connected satellite receiver.

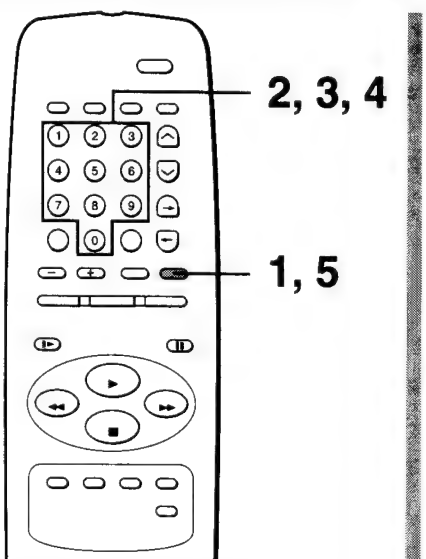
Information

The following settings are required to control your satellite receiver by this VTR.

1) Placing the Satellite Receiver
2) Setting the Satellite Receiver Brand Code
3) Setting the Satellite Receiver Control

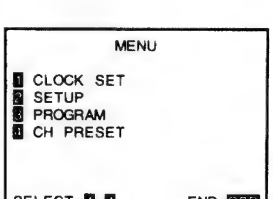
Important

- First perform "Placing the Satellite Receiver".
- Keep the connected satellite receiver turned on.

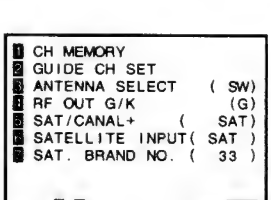


Setting the Satellite Receiver Brand Code

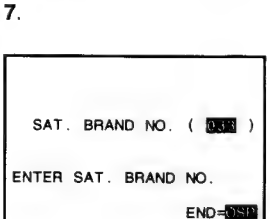
1 Press the **OSP** button.



2 Press **number button 4**.

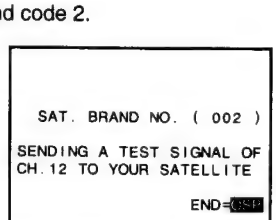


3 Press **number button 7**.



4 Press **number buttons** to enter three figures of the brand code for your satellite receiver.

Example: to enter brand code 2.



When you enter the brand code, the VTR sends a signal to make the channel of satellite receiver 12. Several codes may be allocated to one brand. Enter one after the other so that the channel shows 12.

5 After having confirmed that the channel of the satellite receiver is 12, press the **OSP** button three times to return to the normal TV screen.

Table of Satellite Brand Code

Brand name	Brand code
TOSHIBA	33
ALBA	1, 2, 9, 16, 65, 66
ALDES	88
ALLSAT	9, 16, 23
AMSTRAD	3, 4, 5, 55, 56, 76, 77, 89, 90, 91
ARMSTRONG	43
BEST/DISKEXPRESS	26
BIG BROTHER	7, 8
BUSH	2, 9, 16, 65, 66
CABLE STAR	101, 102, 103, 104
CABLETIME	101, 102, 103, 104
CHANNEL MASTER	2, 3, 10
D2MAC DECODER	72
DECSAT/C+ SAT.	72
DRAKE	45
ECHOSTAR	13, 14, 92, 93, 94
FERGUSON	9, 15, 16, 17, 23, 38, 39, 59, 108
FUBA	49, 69, 70, 78, 96
GI	105, 106, 107, 108, 110
GRUNDIG	17, 19, 28, 71
HIRSCHMANN	11, 19, 47, 48
HUTH	74
IMPULSE	105, 106, 107, 108, 110
ITT/NOKIA	17, 26, 27, 50, 51, 52
JERROLD	105, 106, 107, 108, 110
KATHREIN	12, 16, 20, 24, 29, 31, 46, 73, 97
LENCO	49
MACOM	111
MASPRO	17, 20, 64, 67
MIMTEC	21
MORGAN	43

Brand name	Brand code
NAGAI PALSAT	95, 96
NEC	22, 57
NETWORK	9, 16
NORDMENDE	17
OAK	112, 113, 114, 115
PACE	9, 16, 17, 23, 38
PANASONIC	17, 61
PHILIPS	16, 24, 46, 73
REDIFFUSION	25
REVOX	21
SAKURA	62, 63, 68
SALORA	17, 26, 27, 50, 51, 52
SAMSUNG	36
SCHWAIGER	23, 43
SCIENTIFIC ATLANTA	116, 117, 118
SEEMANNS	23
SENTRA	10
SONY	30
STRONG	31
TATUNG/NIKKO	32, 54, 58, 80, 81
TECHNISAT	40, 41, 92, 93
TELEDIREKT	23
TEXSCAN	119, 120
THOMSON	7, 17, 39
TRISTAR	31
UNIDEN	67
VIDEOTRON	105, 106, 107, 108, 109, 110, 121
VIDEOWAY	105, 106, 107, 108, 109, 110, 121
VISIOPASS	16, 24, 46, 73
VORTEC	36
WISI	35, 37, 44, 93

- For some brands, several brand codes are allocated.
- Some satellite receivers may not be operated at all with this VTR.

4 SATELLITE RECEIVER CONTROL

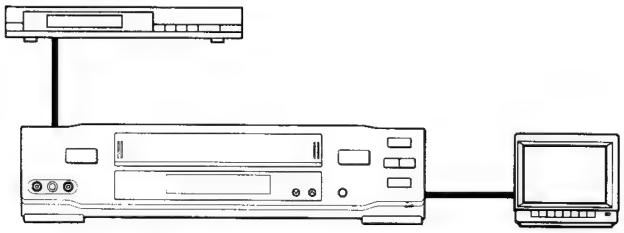
Information

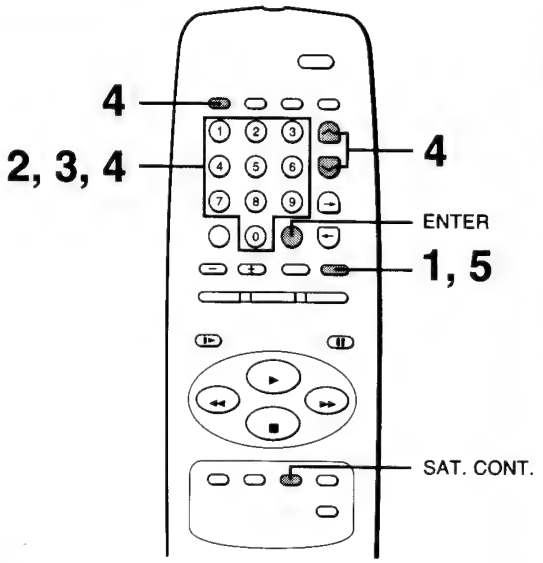
You can select satellite stations by operating this VTR. It is also possible to change automatically satellite stations according to your programme setting in the timer programme recording mode. See "TIMER PROGRAMME RECORDING".

Important

- Perform "Setting the Satellite Receiver Brand Code" beforehand.
- Keep the connected satellite receiver turned on.

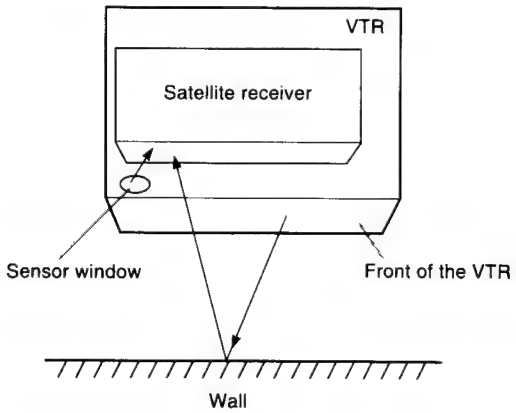
Satellite receiver





Placing the Satellite Receiver

Put the satellite receiver on the top of the VTR as shown below.
Do not block the sensor window.

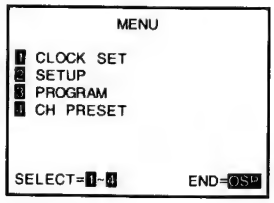


The infrared signals come out of the sensor window and the front of the VTR, and they bounce off walls and objects in the room and are received by the satellite receiver.
The VTR sends out infrared control signals to your satellite receiver even during timer programme recording.

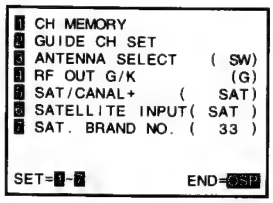
Note
If the satellite receiver cannot be controlled properly because the infrared signals fail to reach it, change the position on the VTR so that it can receive the signals enough.

Setting the Satellite Receiver Control

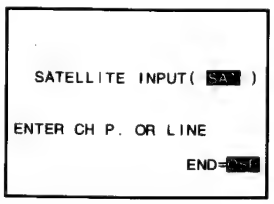
1 Press the **OSP** button.



2 Press **number button 4**.



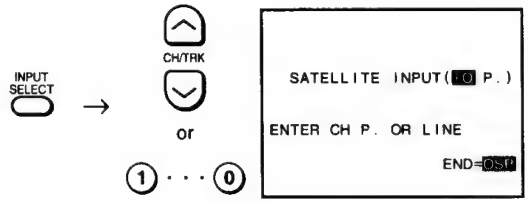
3 Press **number button 6**.



4 Set the position number or line input mode depending on your satellite receiver connection.
If your satellite receiver is connected via . . .

the SAT./DECODER (SCART) socket on the VTR,
press the **INPUT SELECT** button to select "SAT".

the AERIAL INPUT socket,
press the **INPUT SELECT** button, and then set the position number on which you stored the satellite output by using the **CH/TRK** or **number buttons**.



5 Press the **OSP** button three times to return to the normal TV screen.
The satellite receiver control function is ready to use.

Using the Satellite Receiver Control

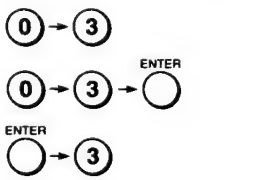
■ SELECTING SATELLITE STATIONS WITH THE REMOTE CONTROLLER OF THE VTR

1) Press the **SAT. CONT.** button to make "SAT", "SA" appear in the VTR display.

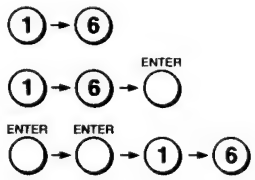
2) Select a desired satellite station using **number buttons**.

Ways of use may differ with models of satellite receiver.
Check how they work on your satellite receiver.
Ex.

- Select satellite station 3.



- Select satellite station 16.



Important

Some satellite receivers may not respond all of the operations above, or may not be operated at all with this remote controller. In such a case, operate the satellite receiver with its own remote controller.

Notes

- Each time the SAT. CONT. button is pressed, this function goes on or off.
- To make a position number appear in the VTR display after you have cancelled this function, press the INPUT SELECT button.

■ CHANGING SATELLITE STATIONS AUTOMATICALLY IN THE TIMER PROGRAMME RECORDING MODE

See "TIMER PROGRAMME RECORDING".

Note

Keep the satellite receiver turned on even while the VTR is in the timer programme recording mode.

4 16:9 (WIDE SCREEN) COMPATIBILITY

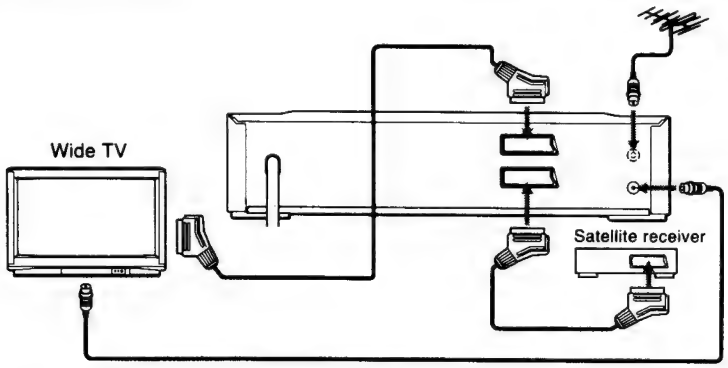
The VTR automatically adjusts the image to fill the wide TV screen when recording or playing back a wide TV programme via the connected satellite receiver, etc.

Information

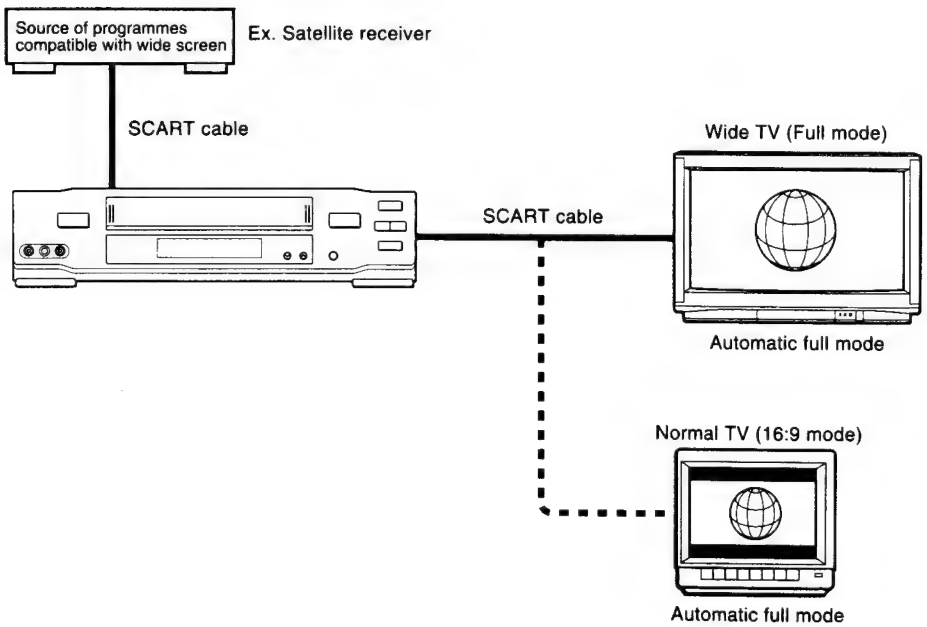
When you play back a tape commercially available which is recorded in the wide screen format, or when you record or play back a wide TV programme via the connected satellite receiver, etc., the VTR automatically adjusts the image to fill the wide TV screen.

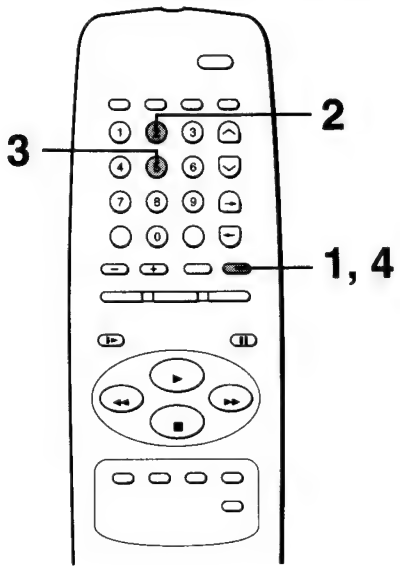
Important

Connect an equipment compatible with wide screen, to the VTR using the SCART cable.



Wide TV and normal TV on this function





Setting of 16:9 Wide Screen

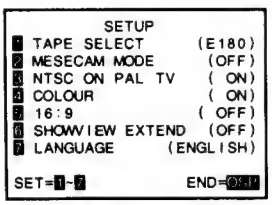
Make the setting when you record or play back a wide TV programme.

1 Press the **OSP** button.
The MENU screen will appear on the TV.

2 Press **number button 2** to select "SETUP".

3 Press **number button 5** to set "16:9".

⑤



OFF: Set if you do not use a wide TV.
AUTO: Set when you use a wide TV. The VTR automatically detects wide TV programmes and normal TV programmes.
ON: The VTR is set usually in the mode compatible with 16:9 wide screen. Set if the VTR cannot detect wide TV programmes with "AUTO" set.

4 Press the **OSP** button twice to return to the normal TV screen.

Instructions for Installing the Optical Infrared Transmitter

The satellite receiver can be controlled through the use of the Optical Infrared Transmitter (Part number: 70148859).

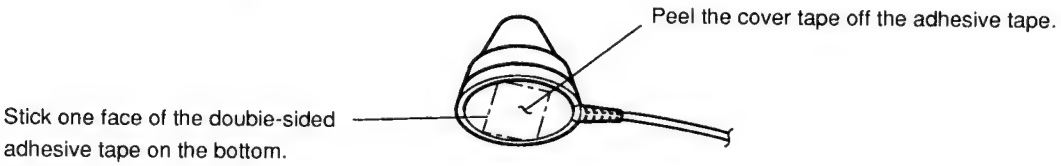
■ Installation and Position Setting

When setting up the brand of the satellite receiver, place the transmitter in such a position that the channel display of the satellite receiver will be changed to 12.

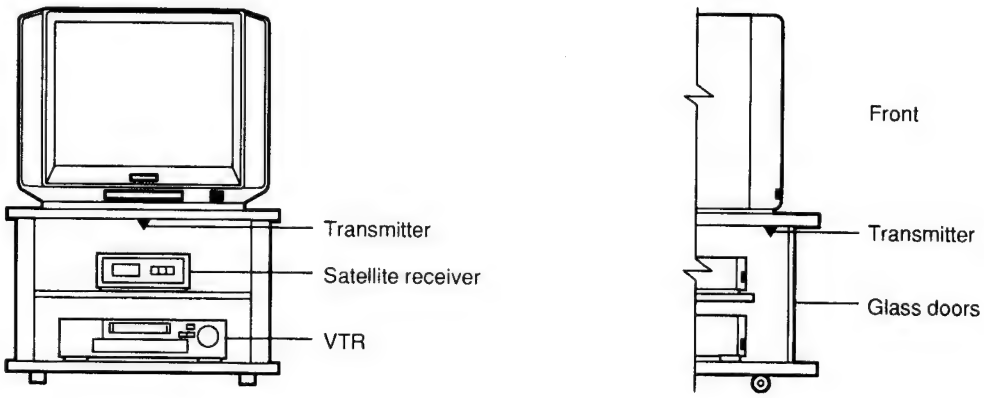
- Select a position where the transmitter is near the remote control sensor of the piece of that needs to be controlled.
- Be careful that the transmitter and its cord do not touch any doors when they are opened and closed.

AD Fixing Method

1. Stick one face of the double-sided adhesive tape on the bottom of the transmitter.
2. After checking the proper operation of the satellite receiver, peel the cover off the adhesive tape attached to the transmitter and place the transmitter in position.

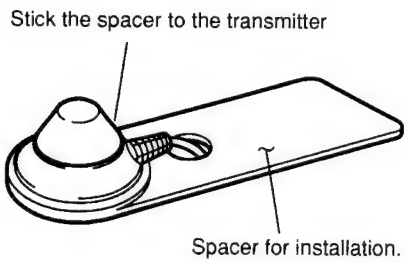


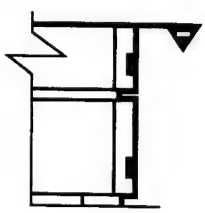
Example of Installation



If a rack or TV table are not available or if there is not enough space for installation, use the supplied spacer for installing the transmitter.

Example of Installation





Stick one face of the double-sided adhesive tape on the spacer.
Then peel the cover tape off the adhesive tape and place the spacer in position.

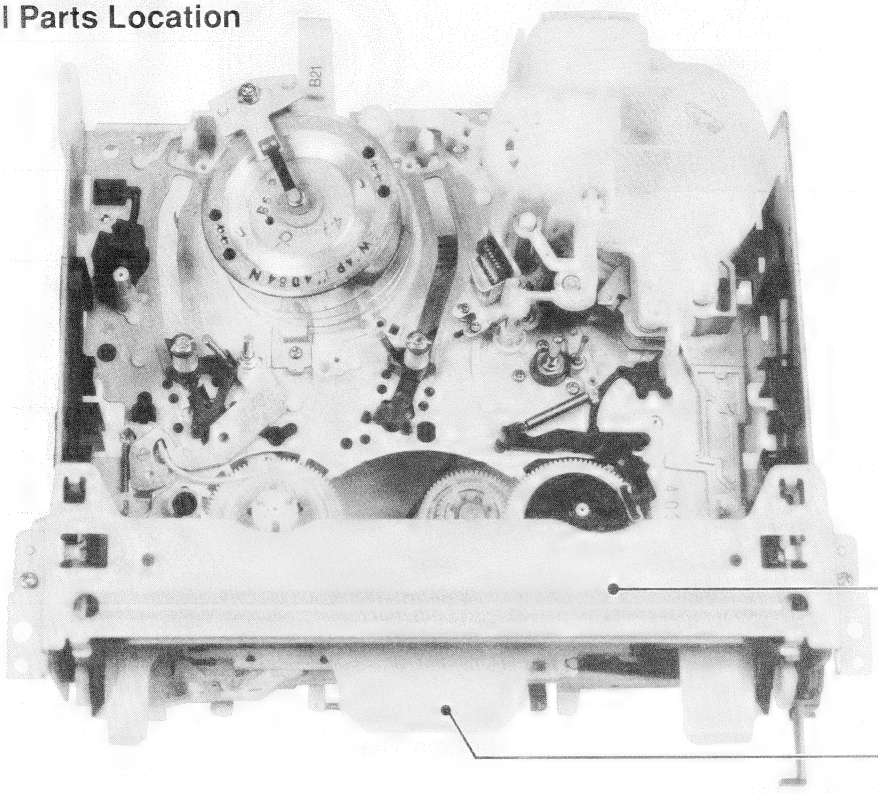
Notes:

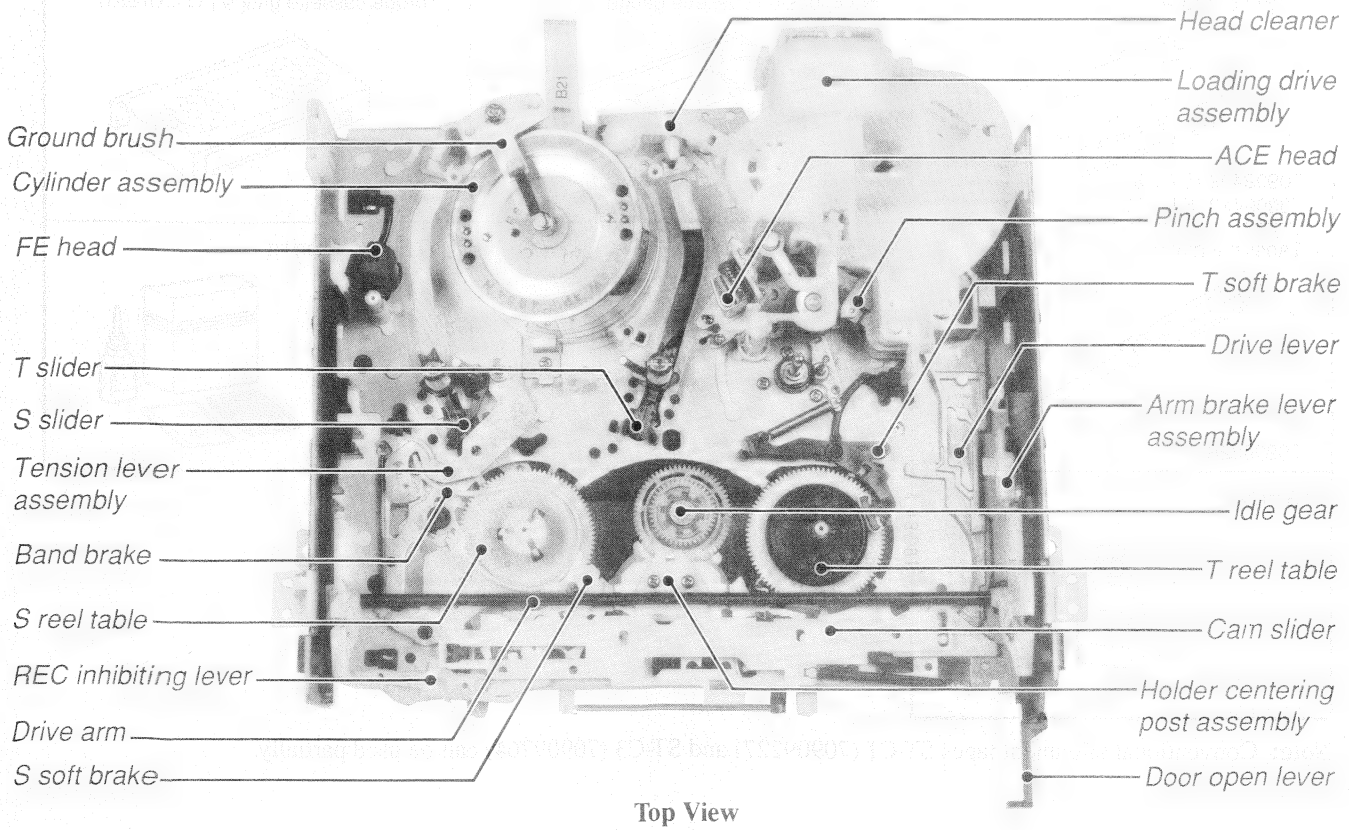
- Set the transmitter installation position so that the distance from the remote control sensor falls within 50 cm. (21 inches)
- Make sure that the remote control sensor of the satellite receiver operates properly if the transmitter is moved slightly.

SECTION 2
ADJUSTMENT PROCEDURES

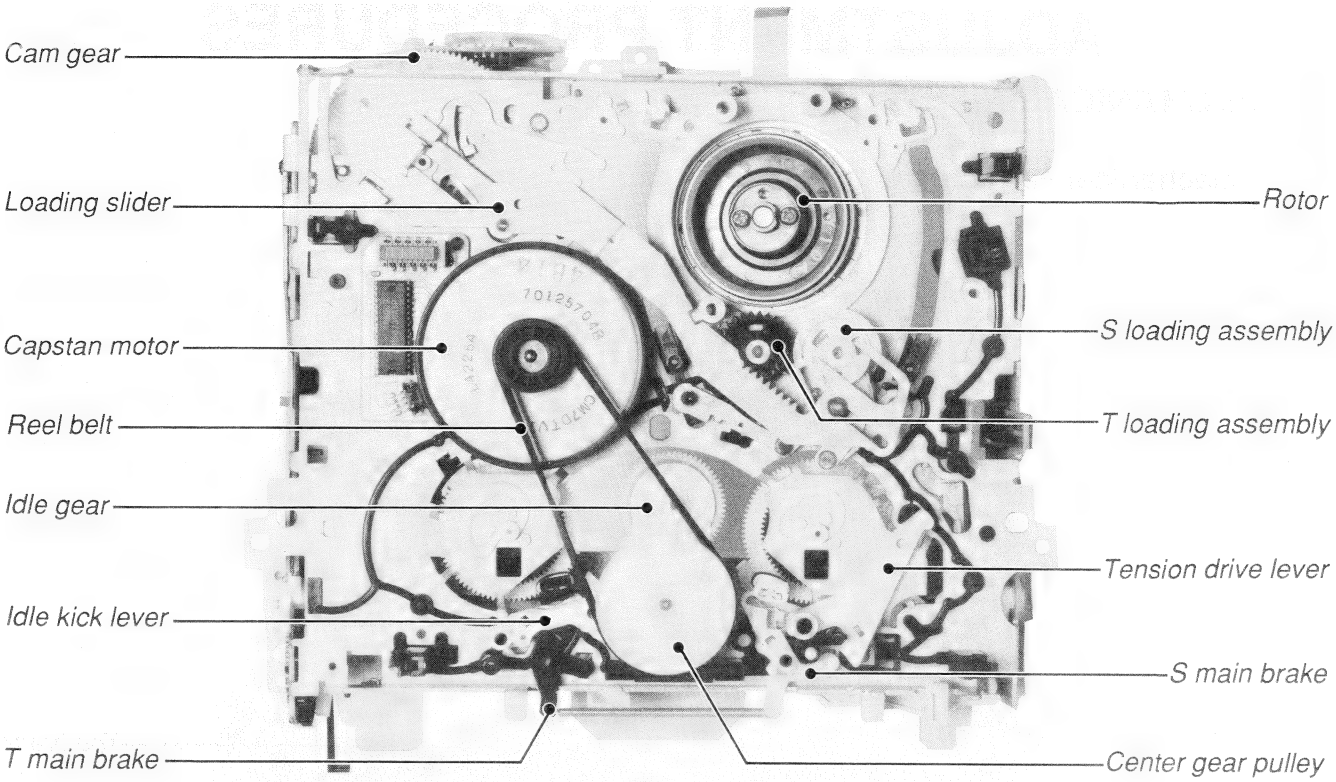
1. MECHANICAL ADJUSTMENT

1-1. Mechanical Parts Location



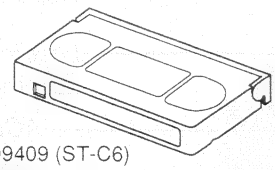
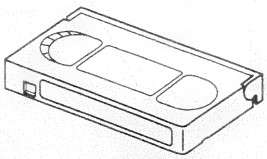
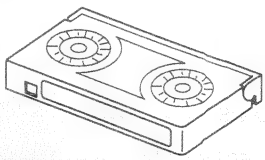
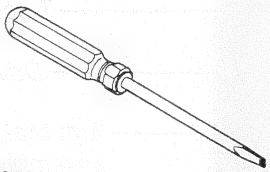
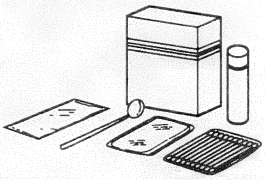
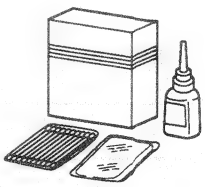


Top View



Bottom View

1-2. Servicing Jig List

Alignment tape  70909409 (ST-C6) 70909410 (ST-C7)	Back tension cassette gauge  70909103	Torque cassette gauge (KT-300NR)  70909199
Taper nut driver  70909228	VTR cleaning kit 	VTR lubrication kit 
Grease 		

Note: Conventional alignment tapes ST-C1 (70909227) and ST-C3 (70909264) can be used partially.

1-3. Main Parts Servicing Time

- Part replacement time differs from servicing life time of each part.
- Following table is prepared based on a standard condition (room temperature, room humidity). The replacement time will be varied depending upon operation environment, using methods, operation duty, etc.
- Particularly, life of the upper cylinder depends upon operation conditions.

	Part Name	Service time (Operating Hours)										Note
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape Transport System	Tension post	△	△	△	△	△	△	△	△	△	△	• When cleaning, use a swab or piece of gauze soaked in alcohol. • After cleaning, cleaned parts are dried comepletely, and then load a video cassette.
	S/T slant guide post											
	Impedance roller *											
	No. 8 guide post											
	Capstan											
	No. 9 guide post											
	No. 3 guide post											
	S/T guide roller	△	△	△	O	O	O	O	O	O	O	• When lubricating, always use the specified oil. • When the lubricating, apply one or two drops of oil after the cleaning with alcohol.
	Upper cylinder	△	O	O	O	O	O	O	O	O	O	
	Slip ring assembly		O	O	O	O	O	O	O	O	O	
	FE head	△	△	△	O	O	O	O	O	O	O	
	ACE head	△	O	O	O	O	O	O	O	O	O	
	Pinch roller	△	O	O	O	O	O	O	O	O	O	
Tape Drive System	Capstan motor	△	△	△	△	△	O	O	O	O	O	• Check the back tension.
	Loading motor				O	O	O	O	O	O	O	
	Loading belt/ Reel belt	△	O	O	O	O	O	O	O	O	O	
	S reel table assembly		O	O	O	O	O	O	O	O	O	
	T reel table assembly		O	O	O	O	O	O	O	O	O	
	Idle gear assembly	△	O	O	O	O	O	O	O	O	O	
Other	Band brake assembly		O		O		O		O		O	

△ : Cleaning O : Check and replace if necessary

* There are two types. One type has an impedance roller and another type has no impedance roller.

1-4. V3 Mechanism Check Method

If the abnormal condition is caused by the mechanism itself, analyze the cause according to the following procedures.

1-4-1. External Appearance Check

(1) Check whether there are foreign matters or not inside the VTR.

(2) Check whether the cylinder and the guides for tape transport system are contaminated.

1-4-2. Motor Sensor System Check

Check whether some abnormalities are found in the motor or the sensor system (including control circuits) according to the flow chart.

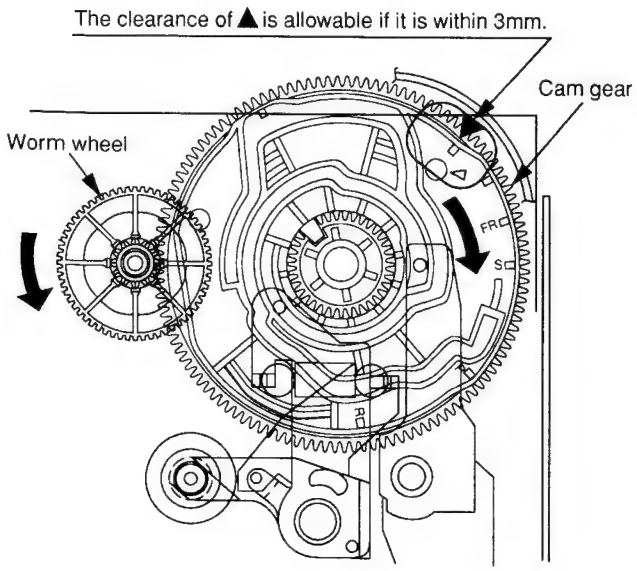
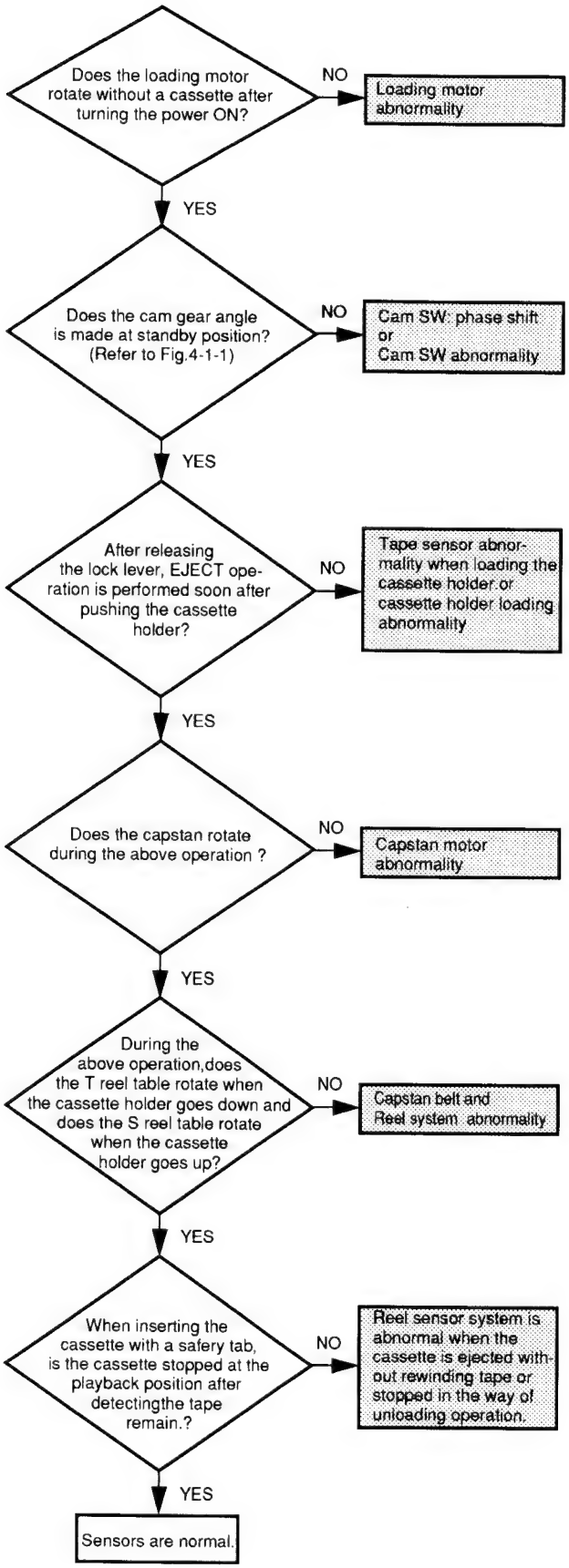


Fig. 4-1-1



1-4-3. Abnormality Analysis by Self-check Function

The unit used V3 mechanism has a self-check function. The self-check function works as a system which stored some abnormal condition. So, use this function to try to analyze the cause(s).

For the data display method and the content of the data, refer to the self-check function (described on page 2-46) in item 2-3.

Note:

- Abnormal data is displayed only when the first abnormal condition occurs, and is not displayed in the second time. Accordingly, the claim from customers and the actual data displayed may be different.
- The data is stored only when the power turns off after occurring the abnormality condition(s). The data is not stored when the unit operation is recovered by the microcomputer.
- After repairing, initialize the data by pressing the [COUNTER RESET] button while displaying the abnormal mode.

The typical examples in abnormal condition are shown below.

Table 4-3-1

A	B	C	Abnormal Condition	Check Item
06	01	09	Cylinder is stopped at playback position during playback the tape.	Check the cylinder motor. Check if the cylinder and tape transport guide are clogged.
02	01	0d	Cylinder is stopped at FF/REW position during rewind the tape.	
06	02	09	T reel sensor is abnormal at playback postion during playback the tape.	Check the capstan motor. Refer to the cases 2 and 3 describe on the table "Defective analyzing list".
03	03	07	S reel sensor is abnormal at playback position during REVIEW the tape.	
01	04	02	Cassette-in and out operation cannot be performed.	Refer to the case 1 described on the table "Defective analyzing list".
03	05	08	Mode shift cannot be performed during shifting to REVIEW.	

A: System control mode, B: Abnormality No., C: Mechanical position when an abnormality occurs.

1-4-4. Check by Defective Analyzing List

If the abnormality causes the mechanism abnormal condition, presume, confirm and treat the defective according to the "Defective analyzing list" in table 4-4-1.

(1) Manual mechanism operation (mode shift) method

Push in the lock lever R and L manually and turn the worm wheel counterclockwise as shown in Fig. 4-1-1. The cam gear is turned clockwise and the mode shifts to the direction where the loading operation can be performed. So, check the mechanism condition in the defective mechanism position when the abnormality occurs.

(2) Defective parts replacement

When a defective occurs due to the defective part(s) and the part(s) is replaced, take care the following items.

- Especially as for the mechanical parts requiring the phase alignment, take care of the part replacement **E.g.**. Assembling mode, phase alignment mark and etc.
- As for the part(s) requiring lubricant such as a specified amount of oil or grease, apply grease or oil according to the instructions and do not stick grease or oil to the portions without allowing to stick it (especially in removal and assembly).

(3) Check after treating the defective

After replacing a defective part and/or aligning a part, first check the mechanism operation manually and confirm that no problem occurs, and then mount the mechanical deck, turn the power ON and check the mechanism operation.

Note:

- After replacing the defective parts according to the procedure of the treatment method for the "damage and phase shift of mechanical part", check the operation of the mechanism again, since the same (or similar) defective problem may occur due to other serious cause (in mechanism or electrical circuit) when performing the actual total check with turning the power on.

Table 4-4-1 Defective Analyzing List

Case	Defective Phenomenon (Main Items)	Presumed Cause (Main Cause)	Check Method
1	Power does not turn on. Loading operation is defective. Mode shift operation is defective.	<General> Mechanical stops due to mechanical phase unmatching.	Check mode shift "Cassette out FF/REW position" can be performed when turning worm wheel.
	Loading operation is not performed.	Loading motor does not rotate. (Loading motor is defective or circuit is defective.)	Check loading motor whether it turns by the outer power supply (12.5V).
	Unloading operation is not performed.	S reel does not wind the tape.	Refer to case 3 in this table.
2	Playback operation is not performed. Playback operation is defective.	<General> Main brake is not released. (ON) T soft brake is not released. (ON) Idoler does not swing. Pinch does not press.	Check mechanical position.
		Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
	Playback picture does not appear. Video recording can not be performed.	<In case of no mechanical problem> Cylinder is defective. (Circuit is defective.)	Check cylinder assembly.
3	Playback interruption. Detective phenomenon during playback. Recording interruption.	Reel rotation detection is defective. (Sensor is defective. Circuit is defective.)	Check sensor output.
		Idler does not swing.	Check mechanical position.
		Reel belt is removed.	Check the reel belt is removed or not.
4	FF operation is not performed. FF operation is defective. REW operation is not performed. REW operation is defective. Others: REV/FF is not performed. Others: REV/FF is defective.	Main brake is not released. (ON) T soft brake is not released. (ON) Idler does not swing. Pinch is not released.	Check mechanical position.
		Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
5	REVIEW is not performed.	Main brake is not released. (ON) T soft brake is not actuated . Idler does not turn. Pinch does not press.	Check mechanical position.
		Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
6	Slot-in is not performed. Cassette can not be inserted.	<General> When the F/L is mounted on the mechanical deck,the position is not correct.	Check mechanical position.
7	Capstan servo does not work. Capstan servo is uneven. Tape speed is fast. Tape speed is slow. Tape speed is uneven. FG pulse is not output.	Capstan motor is defective.	Check capstan motor.
		ACE head control output is defective. (Circuit is defective.)	Check ACE head. Check CTL output.
8	Audio output does not come out. Audio output is small. Audio output variation is large. Audio output is uneven. Audio distortion. Audio noise. Others: Audio is defective.	ACE head is defective.	Check ACE head. Check CTL output.
		Tape transport adjustment is not defective.	Perform tape transport adjustment again after confirming tape transport condition.
		Hi-Fi head (cylinder) is defective. (Circuit is defective.)	Check cylinder. Check whether B+14V is supplied.

Treatment: If the mechanical is found out to be defective according to the procedures described above, perform the following treatment.
- •Misassembling, mechanical phase mismatch .....Repair correctly.
- •Parts defect, parts damage.....Replace parts.

If the mechanical is found out not to be defective according to the procedures above, check the circuit(s).

1-5-2. Mechanical Deck Mounting

1. Turn over the mechanical deck and lower the main unit vertically adjusting the tape end sensor and etc. to the holes.

Note:

- Adjust the rotor of the cylinder motor and the stator of the main unit, and then lower the main unit further more till four claws catch the mechanical deck completely.
- Take care not to damage the rotor and the stator.
- When locking the claw of the front right side to the main unit, turn the REC inhibit lever so as not to damage the switch.

2. Mount the mechanical deck on the chassis in reverse order of removal.

Note:

When mounting the front panel, mount it with its door fully open.

1-5-3. Confirmation of Each Operation Mode without Cassette

1. Shut out the light to the start/end sensor.
2. Release the both sides of the lock lever and make a slot-in condition.
3. Turn the reel table manually located on the opposite side of the rotating reel table.
4. In this condition, confirmation of each operation mode can be performed.

Note:

When turning the opposite side reel table of the rotating reel table manually in playback, FF/REW mode, and sending no reel pulse, the auto eject or power off function is performed.

1-5. Mechanical Deck Removal and Mounting

1-5-1. Mechanical Deck Removal

1. Remove five screws (2) mounting the top cover (1) and remove the top cover (1) sliding backward and lifting upward.
2. Remove two screws (4) securing the front panel (3) and remove the front panel (3).
3. Remove the FFC (7) connecting the main unit (5) and the KDB unit (6).

Note:

Be sure to remove the FFC on the KDB unit side.

4. Remove two screws (9) securing the power unit (8).
5. Remove three screws (11) securing the mechanical deck (10).
6. Remove the claw securing the main unit (5) and the terminal board (12).
7. Remove a screw (15) securing the earth lead wire (14) and remove the earth lead wire (14).
   After removing the earth lead, secure a screw (15) to hold the top bracket (13).
8. Remove the mechanical deck (10) with the main unit (5) from the chassis lifting the terminal board (12) slightly and pulling the top bracket (13) upward.

Note:

When pulling the top bracket (13) upward, take care not to deform the reinforcement plate located below the F/L assembly.

9. Remove the lead wire connecting between the mechanical deck (10) and the main unit (5).
10. Turn over the mechanical deck (10).
11. Remove the reel belt (16) and one screw (17).
12. Remove four claws securing the mechanical deck (10) and the main unit (5), and then remove the main unit (5) pulling upward.

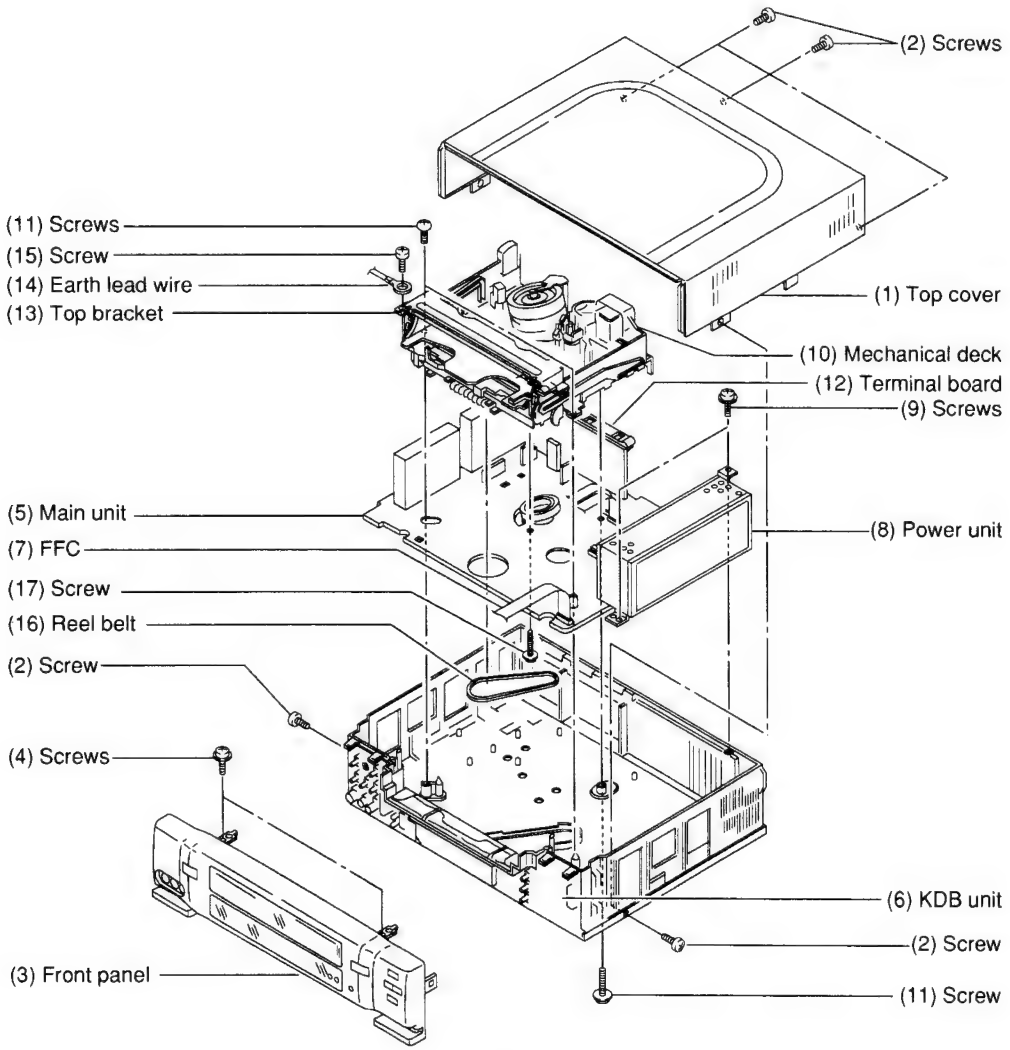


Fig. 5-1-1

1-6. Main Parts Replacement

1-6-1. Top Bracket Replacement

1. Remove two securing screws (2) on the top bracket (1).
2. Remove the top bracket (1) lifting in the direction shown by the arrow.

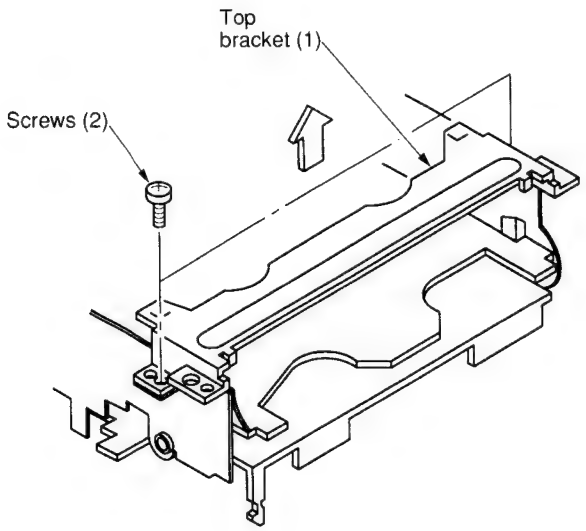


Fig. 6-1-1

3. When mounting the top bracket (1), move the tip of the grip lever (3) on the cassette holder assembly to the inclined portion of a trapezoidal cam, and then mount the top bracket (1).

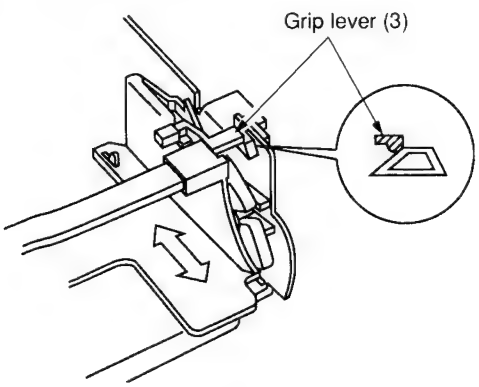


Fig. 6-1-2

Note:

- After remounting the top bracket (1), move the cassette holder forward and backward, and then confirm the claws of the lock lever (5) catch completely the both left and right sides of the stopper section (4) at the top bracket (1).

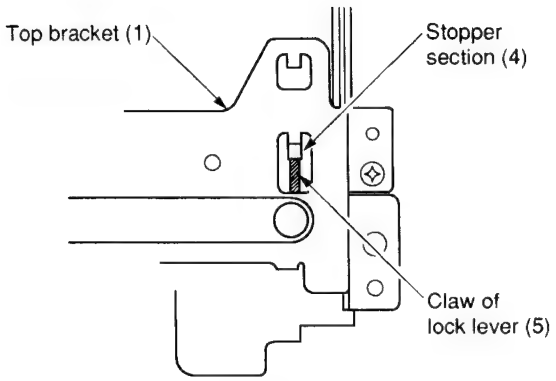


Fig. 6-1-3

1-6-2. Cassette Holder Assembly Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. The cassette holder assembly (1) is guided along the guide grooves (2) with both left and right bosses of the cassette holder assembly (1). So first remove each side boss (3) on both left and right sides of cassette holder assembly (1) from the guide groove (2).
3. When the cassette holder assembly (1) is set at the EJECT position, the boss is located at (a), so move the boss from (a) to (b) and remove the bosses on both left and right sides simultaneously.

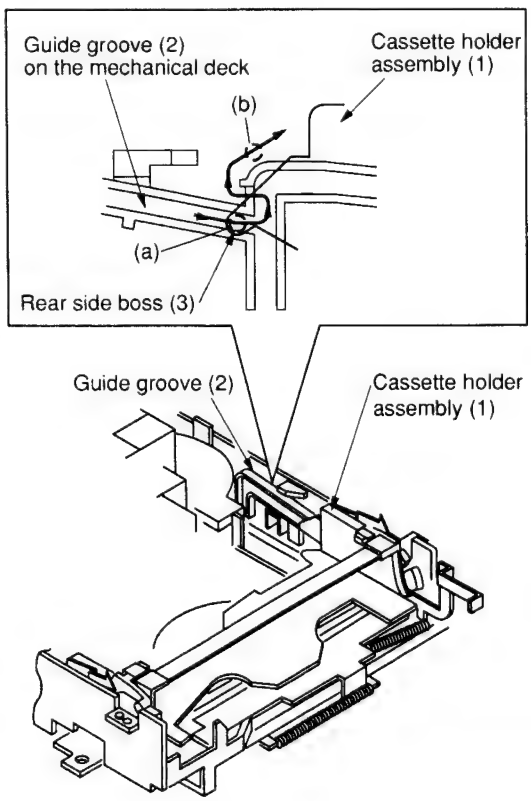


Fig. 6-2-1

Note:

The grip lever (4) on the cassette holder assembly (1) may catch the trapezoidal cam on the mechanical deck (2), so perform the work lifting the grip lever in the direction shown by the arrow.

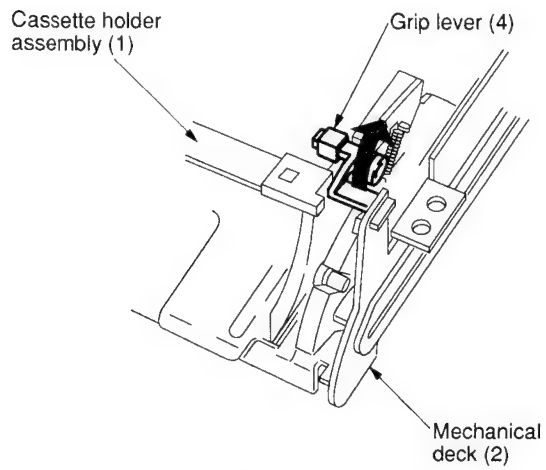


Fig. 6-2-2

4. After removing the front side bosses (5) on both left and right sides, remove the cassette holder assembly (1) pulling to the front side.
5. When mounting the cassette holder assembly (1), insert the front side bosses (5) to the U shaped groove of the drive arm (6) and the guide groove (2) on the mechanical deck lifting the rear side of the cassette holder assembly (1).

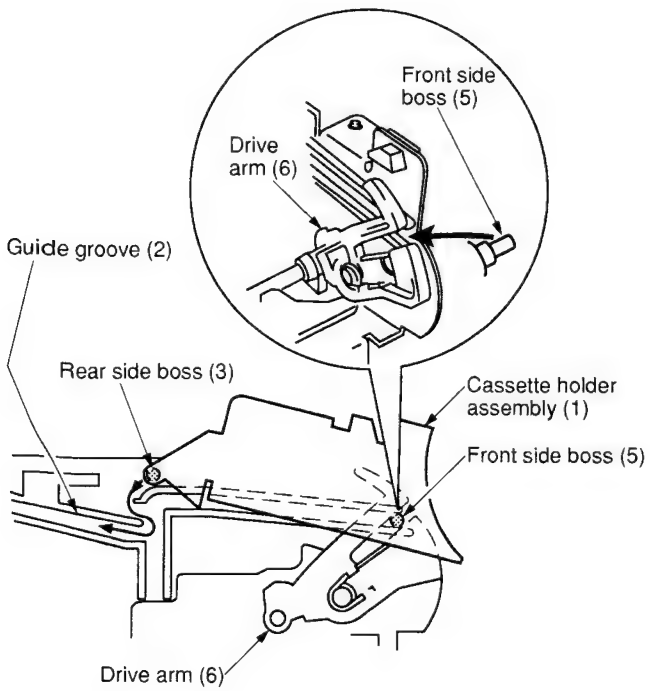


Fig. 6-2-3

6. When mounting the rear side bosses (3), perform the reverse order of removal.

1-6-3. Door Open Lever Replacement

1. Release the lock lever (2) on the cassette holder assembly (1) pressing in the direction shown by the arrow.

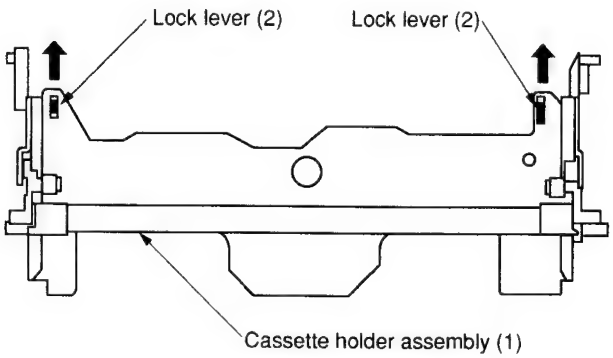


Fig. 6-3-1

2. Move the cassette holder assembly (1) slightly to the rear side.
3. Remove the claws (A) and (B) on the door open lever (3) from the mechanical deck (4).
4. Match the boss on a new door open lever (3) and the hole (C) on the mechanical deck, and then insert the claws (B) first and then (A) to the mechanical deck (4).

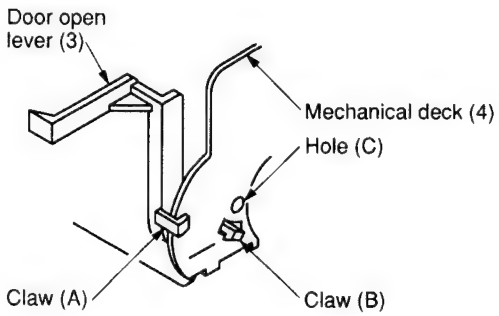


Fig. 6-3-2

5. Remount the cassette holder assembly to the position as it was.

1-6-4. Drive Lever Gear Replacement

1. Make the cassette holder assembly to the slot-out (EJECT) position.

Note:

- In this condition, both mark holes on the F/L drive slider (1) and the mechanical deck fit with each other, also the hole of the boss on the drive lever gear (2), the center of the gear tooth and the marking line are in line.

2. Move the claw of the drive arm (3) to the direction of the arrow (A) and remove the drive lever gear (2) upward.

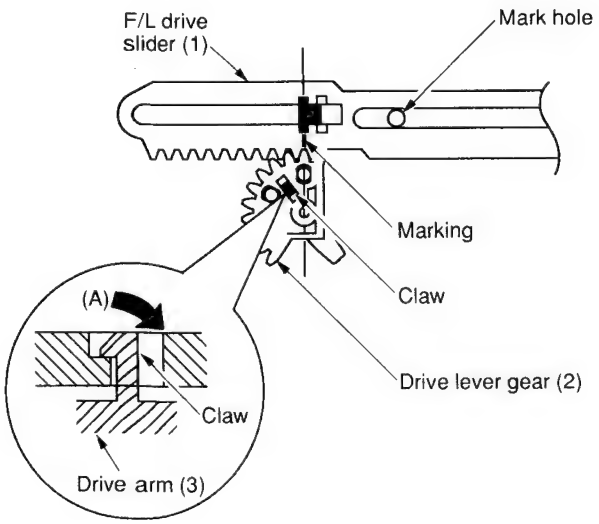


Fig. 6-4-1

3. When remounting the drive lever gear (2), take care of the phase position (refer to the note described above.) and mount in the reverse order of removal.

1-6-5. Drive Arm Assembly Replacement

1. Remove the top bracket assembly. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the door open lever. (Refer to item "1-6-3. Door Open Lever Replacement.")
4. Remove the drive lever gear. (Refer to item "1-6-4. Drive Lever Gear Replacement".)
5. Pull the REC-inhibiting lever slightly to the front side, turn the drive arm assembly (1) to the front side and push it in the direction shown by the arrow. Remove the left side boss (2) on the drive arm assembly (1) from the cutout of the guide groove on the mechanical deck (3).
6. Remount the drive arm assembly (1) in the reverse order of removal.

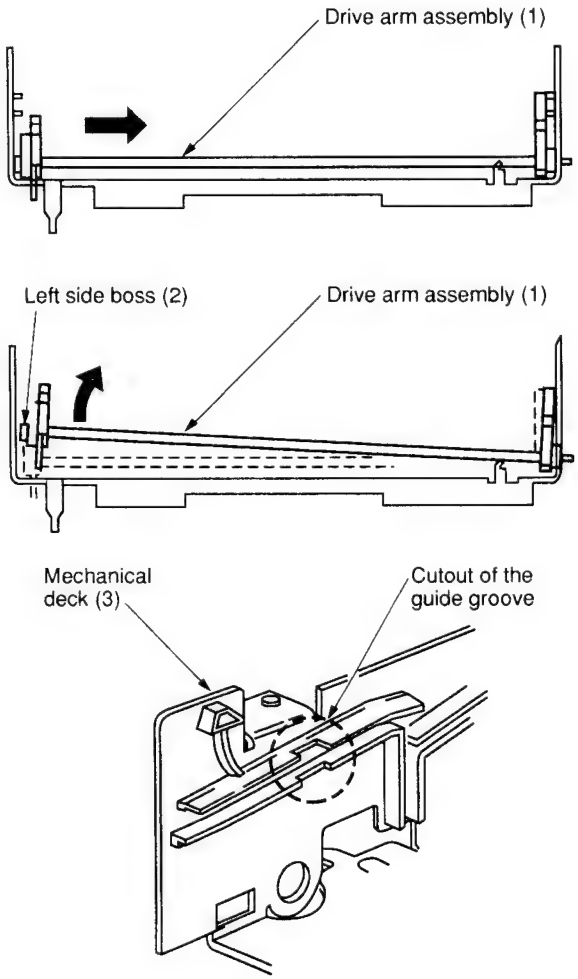


Fig. 6-5-1

1-6-6. Cam Lever Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-38. Cam Slider Replacement".)
4. Remove the loading drive assembly. (Refer to item "1-6-26. Loading Drive Assembly Replacement".)
5. Remove the drive lever. (Refer to item "1-6-37. Drive Lever Replacement".)
6. Remove the pinch roller assembly. (Refer to item "1-6-18. Pinch Roller Assembly Replacement".)
7. Remove the cam gear. (Refer to item "1-6-28. Cam Gear Replacement".)
8. Move the cam lever (1) until it stops in the direction shown by the arrow (A). Pull out the cam lever (1) lifting up straightly at the position where the cam lever (1) stops.
9. Apply grease to the portions of bosses (A) to (C) on a new cam lever.

Note:

- Confirm that the boss (A) on the cam lever (1) is inserted into the hole on the F/L drive slider (2).
- After inserting the cam lever (1), confirm that the cam lever (1) moves smoothly.

10. Replace the cam lever in the reverse order of removal.

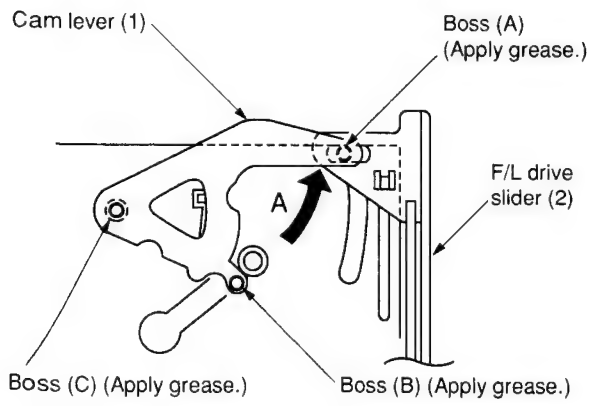


Fig. 6-6-1

1-6-7. F/L Drive Slider Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-38. Cam Slider Replacement".)
4. Remove the loading drive assembly. (Refer to item "1-6-26. Loading Drive Assembly Replacement".)
5. Remove the drive lever. (Refer to item "1-6-37. Drive Lever Replacement".)
6. Remove the pinch roller assembly. (Refer to item "1-6-18. Pinch Roller Assembly Replacement".)
7. Remove the cam gear. (Refer to item "1-6-28. Cam Gear Replacement".)
8. Remove the cam lever. (Refer to item "1-6-6. Cam Lever Replacement".)
9. Remove the drive lever gear. (Refer to item "1-6-4. Drive Lever Gear Replacement".)
10. Push the F/L drive slider (1) in the direction shown by the arrow (A) and slide it. Furthermore, pull out it to the front side lifting it in the direction shown by the arrow (B).
11. Apply grease to the shaded parts (a) to (d) on a new F/L drive slider (1).

Note:

For the phase alignment of the drive lever gear, refer to item "1-6-4. Drive Lever Gear Replacement".

12. Replace the F/L drive slider (1) in the reverse order of removal.

Note:

After completion of the replacement, confirm that the F/L drive slider (1) moves smoothly.

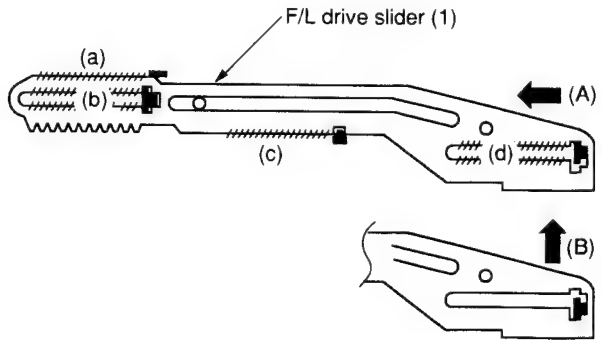


Fig. 6-7-1

1-6-8. Arm Brake Lever Assembly and Arm Brake Torsion Spring Replacement

1. Make the cassette holder assembly to the slot-out (EJECT) position.
2. Turn the arm brake lever assembly (1) in the direction shown by the arrow (A) until it stops. Pull out the arm brake lever assembly (1) to the front at the position it stops.

Note:

Take care that the arm brake torsion spring (2) is removed forcefully.

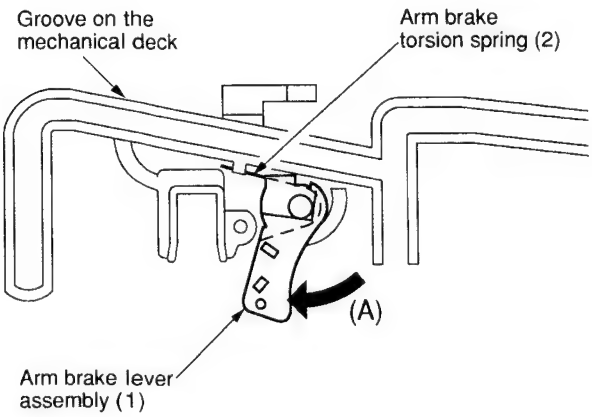


Fig. 6-8-1

3. Hook the arm brake torsion spring (2) temporarily to a new arm brake lever assembly (1).

Note:

Take care of the direction of the arm brake torsion spring (2) so that the longer end of the arm brake torsion spring (2) is hooked on the temporary hook.

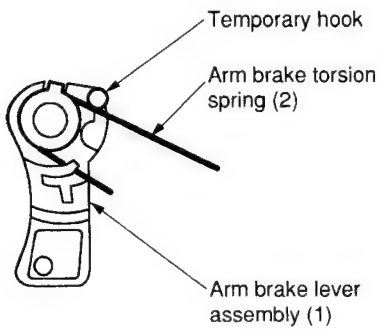


Fig. 6-8-2

4. Insert the hook portion on the arm brake lever assembly (1) to the cutout on the mechanical deck.
5. Turn the arm brake lever assembly (1) counterclockwise and fix it at the position which the arm brake lever assembly (1) faces to the straight below.
6. When pushing the tip of the arm brake torsion spring (2) located at (B) position, the tip is removed from the temporary hook and moves to the hook on the mechanical deck.
7. The arm brake lever assembly turns to the specified position by force of the arm brake torsion spring.

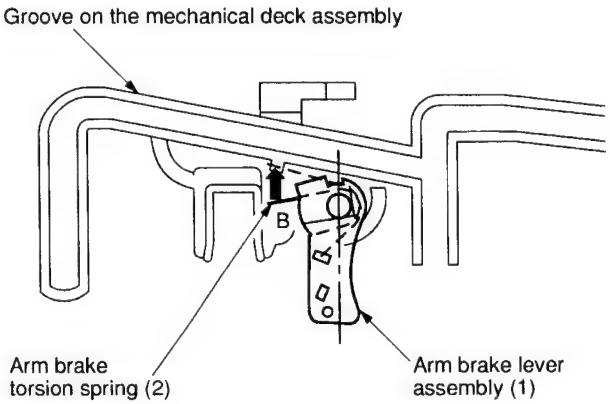


Fig. 6-8-3

1-6-9. Cylinder Assembly Inspection and Replacement

<Inspection>

1. Check if the tape transport surface on the lower cylinder assembly are not damaged.
2. Check if the rotation of the upper cylinder assembly is not abnormal.

When any abnormality is found according to the inspection procedures described above 1 and 2, replace the cylinder assembly.

<Replacement>

1. Remove the ground brush assembly.
2. Remove the head cleaner. (Refer to item "1-6-11. Head Cleaner Replacement.")
3. Remove the FFC (1) on the pre amplifier.
4. Remove three screws (2) and the cylinder holding plate (3) and (4). (Refer to item "1-6-10. Cylinder Holding Plate Replacement".)
5. Remove the cylinder assembly (5).
6. Remount the cylinder assembly (5) in the reverse order of removal. Fix the cylinder pressing slightly in the direction shown by the arrow A and the cylinder holding plate (3) pressing slightly in the direction shown by the arrow (B). (Tightening torque: 294 – 392 mN•m (3 – 4 kg•cm))

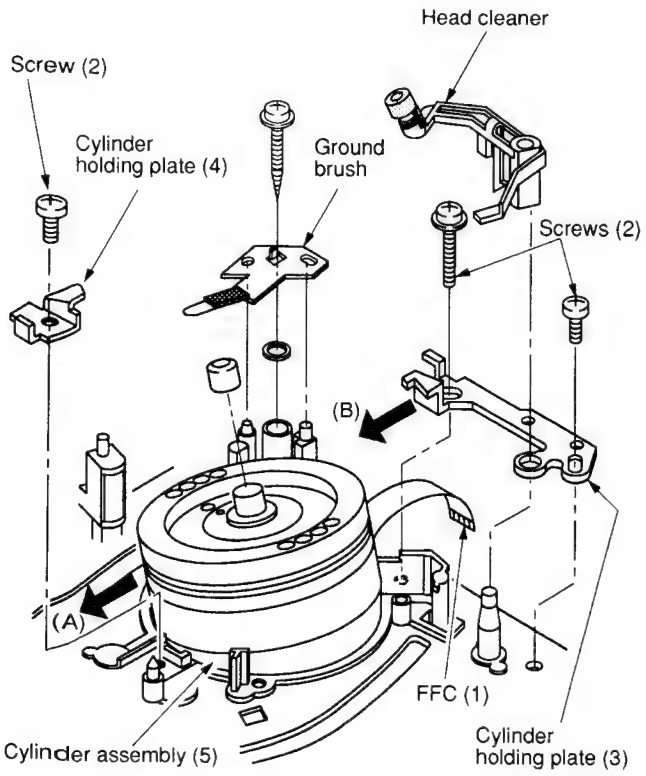


Fig. 6-9-1

Note:

- When remounting the cylinder holding plate (3), insert the FFC under the tip of the cylinder holding plate (3).
- When replacing, take much care not to touch the video head directly and damage the cylinder.

7. Perform the tape transport adjustment.

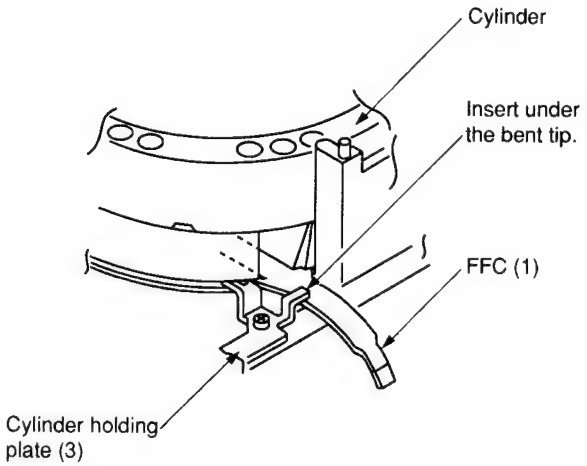


Fig. 6-9-2

1-6-10. Cylinder Holding Plate Replacement

1. Remove screws (1) and (2) securing the cylinder holding plate (3) and a screw (5) securing the cylinder holding plate (4).
2. Remove the cylinder holding plate (3) and (4) sliding in the direction shown by the arrow (B) and (A).
3. Eliminate the cylinder lock key (wedge shaped parts).
4. After replacing the cylinder holding plates (3) and (4), mount new parts in the reverse order of removal.

Note:

- When remounting, fix the cylinder while pushing in the direction shown by the arrow (A) and the cylinder holding plate (3) in the direction shown by the arrow (B). Then tighten three screws while pushing the cylinder holding plate (4) toward the stopper on the outsert of the mechanical deck.
- Take care of the position inserting the FFC. (Refer to item "1-6-9. Cylinder Assembly Inspection and Replacement".)
- Tightening order of the screws is (1) → (2) → (5).
- Tightening torque of the screws (1), (2), (5) is 294 – 392 mN•m (3 – 4 kg•cm).
- Take care of the position inserting the FFC when mounting the cylinder holding plate (3). (Refer to item "1-6-9. Cylinder Assembly Inspection and Replacement".)

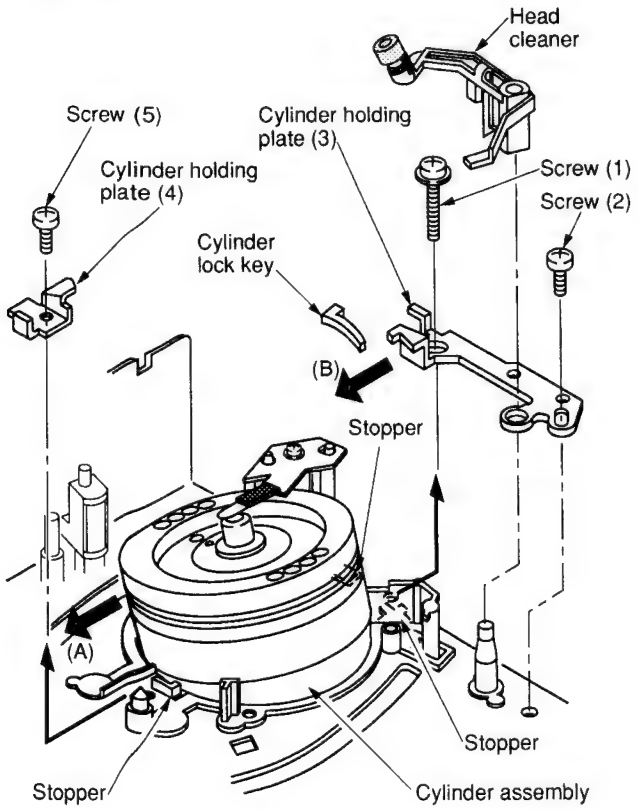


Fig. 6-10-1

1-6-11. Head Cleaner Replacement

<Roller sub assembly replacement>

1. Remove the roller sub assembly (2) pulling upward from the hook (A) on the cleaner lever (1).
2. After replacing the roller sub assembly, mount in the reverse order of removal.

<Cleaner lever replacement>

1. Undo the hook (B) of the cleaner lever (1) from the mechanical deck, and pull out the cleaner lever (1) upward.
2. Replace the cleaner lever (1) on the roller sub assembly (2), and mount the cleaner lever (1) in the reverse order of removal.

Note:

- Take care the roller sub assembly (2) is not stained with grease or oil.

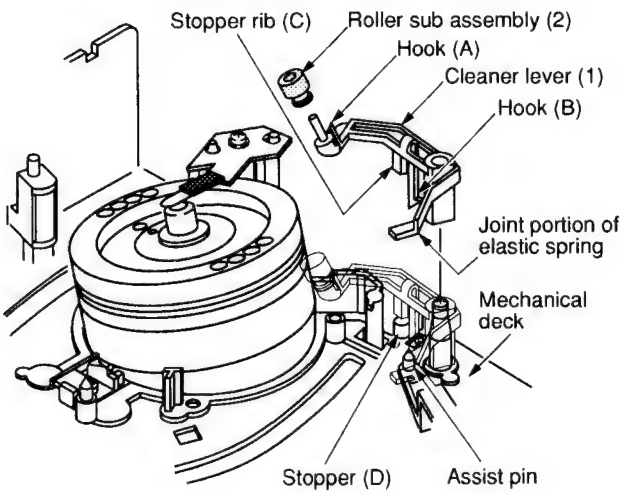


Fig. 6-11-1

Note:

- When remounting the head cleaner, position the stopper rib (C) in front of the stopper (D).

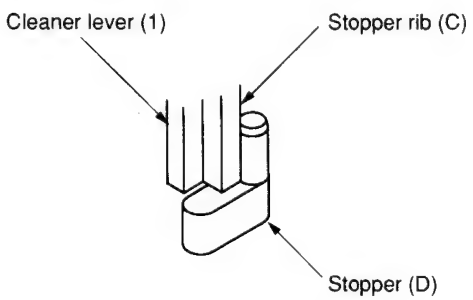


Fig. 6-11-2

Note:

- Confirm that the joint portion (E) of the elastic spring positions in front of the assist pin (F) on the cleaner assist lever (4).

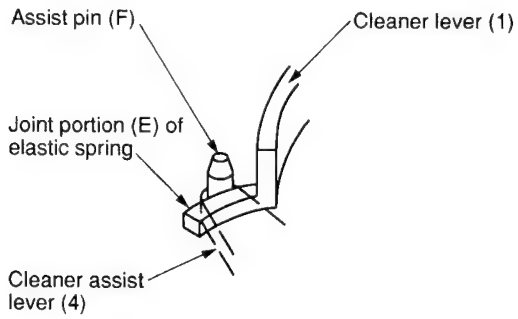


Fig. 6-11-3

1-6-12. No. 8, No. 3 Guide Sleeves Replacement

1. When replacing the No. 8 guide sleeve (1), first remove the guide cap (2) on the loading bracket assembly.
2. Pull out the guide sleeve (1) from the guide post (3).

Note:

- Take care not to break the No. 8, No. 3 guide posts on the mechanical deck if twisting the guide sleeve forcefully.

3. Insert a new guide sleeve (1) to the guide post.

Note:

- When inserting the guide sleeve (1), take care so that its hole faces the opposite side to the tape transport surface.

4. For No. 8 guide sleeve, insert the No. 8 guide cap (2) onto it.

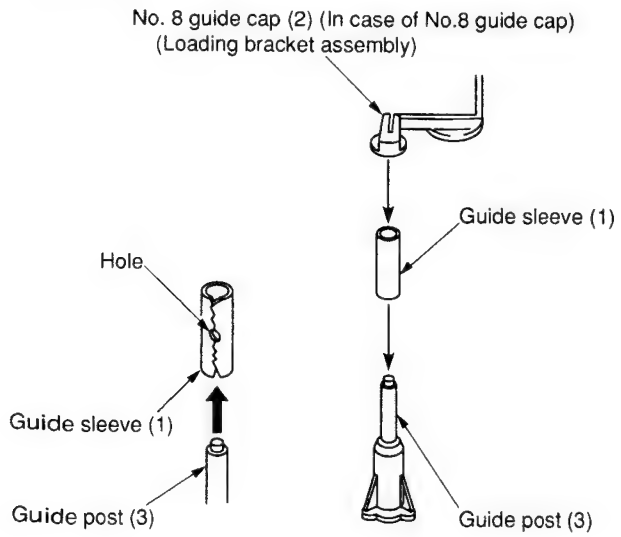


Fig. 6-12-1

1-6-13. ACE Head Assembly Replacement

1. Remove the FFC (1) from the connector.
2. Remove two screws (2) and remove the ACE main base (3) and ACE head assembly (4).
3. Remove three adjusting screws (5), (6), and (7) and then remove the ACE head assembly (4).

Note:

- When replacing ACE head (9) only without replacing its PC board, unsolder the ACE head (9) on the ACE head PC board (8) and then remove the ACE head (9) and the ACE head PC board (8).

4. Mount the ACE head assembly (4) in the reverse order of removal.

Note:

- When reassembling the ACE head assembly (4), First set the ACE springs (10) between the ACE head assembly (4) and the ACE main base (3), and secure the adjusting screws (5), (6), and (7).

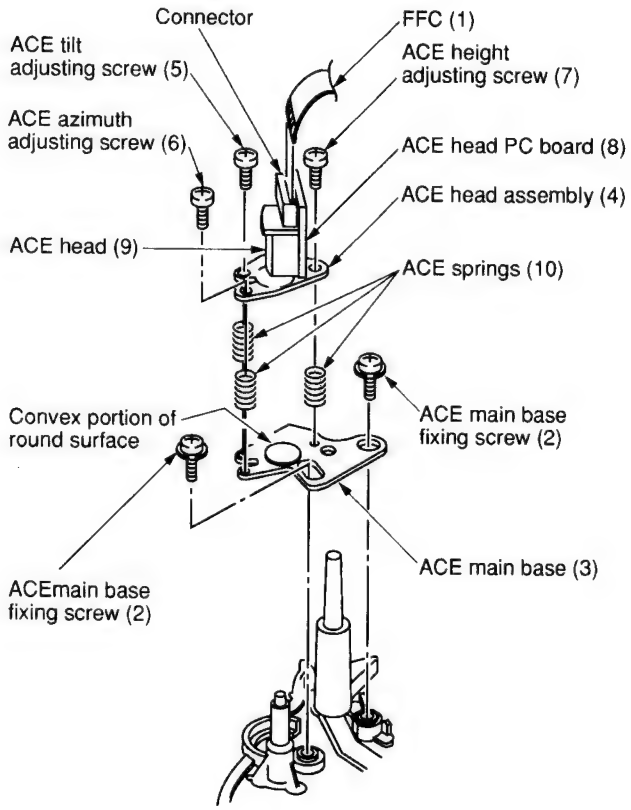


Fig. 6-13-1

- When securing three adjusting screws, mount the ACE main base (3) and ACE head assembly (4) so that the clearance between them becomes parallel with the specified preset value (4.3 ± 0.1 mm).

5. After replacing, perform the tape transport adjustment.

Note:

- When replacing the ACE head assembly (4), always use an ACE head (9) having the same part number. Do not use any other ACE head assembly.

1-6-14. FE Head Replacement

1. Open the FE head holding hook (1) on the mechanical deck slightly in both left and right directions and remove the FE head (2) by moving in the direction shown by the arrows.
2. Replace the FE head (2) and mount the parts in the reverse order of removal.
3. Perform adjustment from the linearity adjustment item in the tape transport system adjustment.

Note:

- When mounting the FE head, Push the head backward completely.
- Though FE head (2) can be removed upward by opening the FE head holding hook (1) to both left and right directions, perform the standard replacement procedure described above since this may cause deformation of the hook.

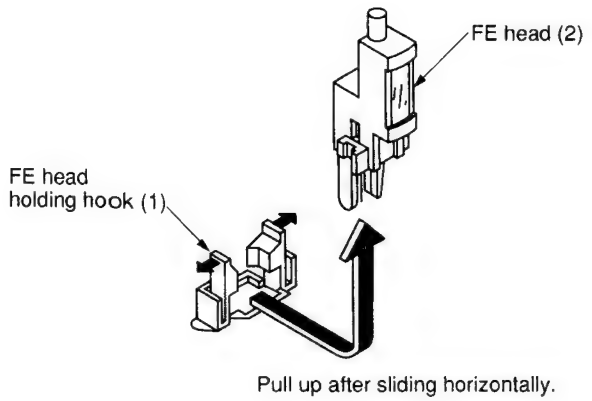


Fig. 6-14-1

1-6-15. S, T Slider Replacement

1. Remove the tension lever assembly. (Refer to item "1-6-20. Tension Lever Assembly Replacement".)
2. Remove the loading slider. (Refer to item "1-6-22. Loading Slider Replacement".)
3. Remove the S loading assembly. (Refer to item "1-6-21. S Loading Assembly Replacement".)
4. Remove the T loading assembly. (Refer to item "1-6-21. T Loading Assembly Replacement".)
5. Remove the S slider (1) and T slider (2) lifting up to the cutout of the groove on the mechanical deck (3).
6. Remove the S and T guide rollers and mount a new slider.
7. Mount the parts in the reverse order of removal.

Note:

Perform the phase alignment between the loading slider (4) and S, T loading assemblies (5), (6) referring each replacement procedure.

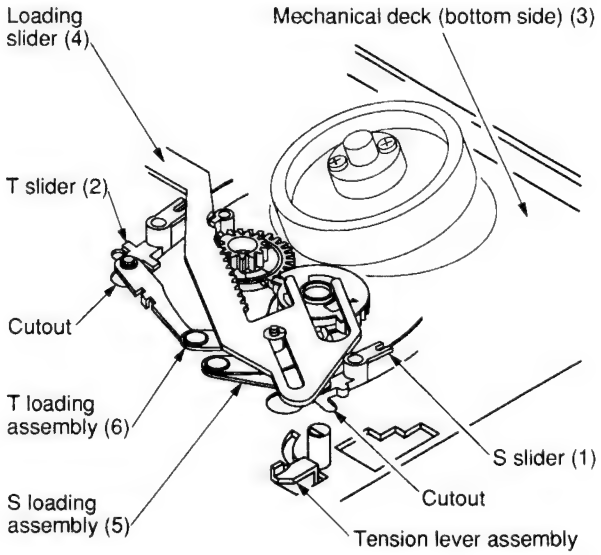


Fig. 6-15-1

8. After completion of the replacement, perform the adjustment from item 1 in the tape transport system adjustment.

1-6-16. S, T Guide Rollers Replacement

The same replacement procedures will be applied for the S, T guide rollers.

1. Turn the guide roller (1) counterclockwise and remove the guide roller (1) from the slider assembly (2).
2. Mount a new guide roller on the slider assembly (2) turning clockwise.
3. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment.

Note:

- O ring is not applied to the T guide roller.
- For the T guide roller, marking is located on the upper flange. So take care not to mis-mount with the S guide roller.

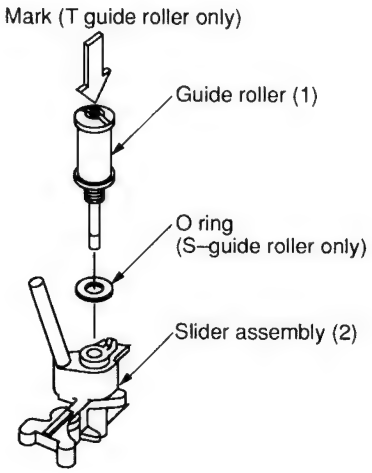


Fig. 6-16-1

1-6-17. S, T Impedance Roller Replacement

1. Remove two screws (1) and (2), and then remove two brackets (3), (4).
2. Replace two impedance rollers (5), (6).
3. Mount the parts in the reverse order of removal.
4. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment.

Note:

- S, T impedance rollers (5), (6) is not always applied to all models.

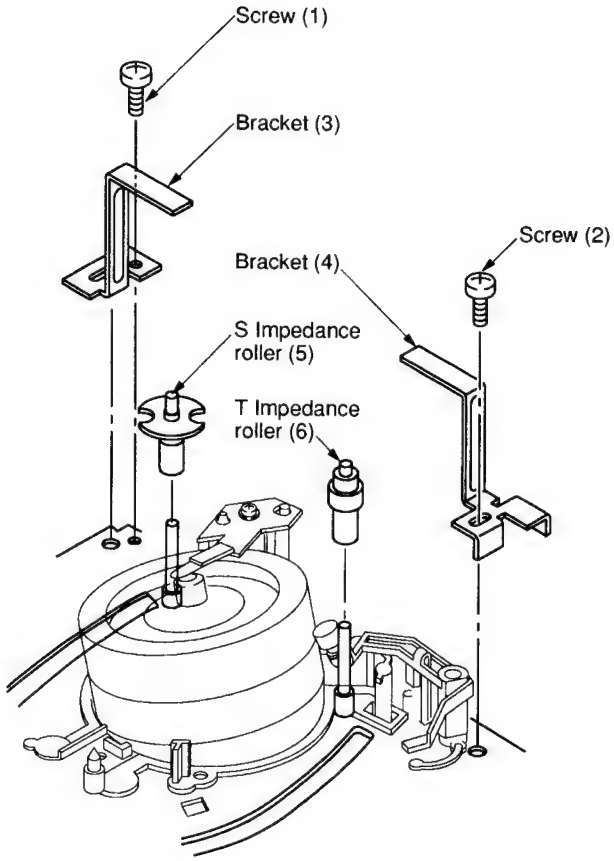


Fig. 6-17-1

1-6-18. Pinch Roller Assembly Replacement

1. Remove the loading drive assembly (Refer to item "1-6-26. Loading Drive Assembly Replacement".)
2. Remove the pinch assembly (1) lifting vertically from the pinch post (2).
3. Remove the pinch spring (5) from the hooks on the pinch drive assembly (3) and the pinch lever assembly (4).
4. Turn the projection (A) on the pinch drive assembly (3) counterclockwise till it goes to the cutout on the pinch lever assembly (4).
5. After replacing, mount the parts in the reverse order of removal.
6. After completion of the replacement, perform the tape transport adjustment.

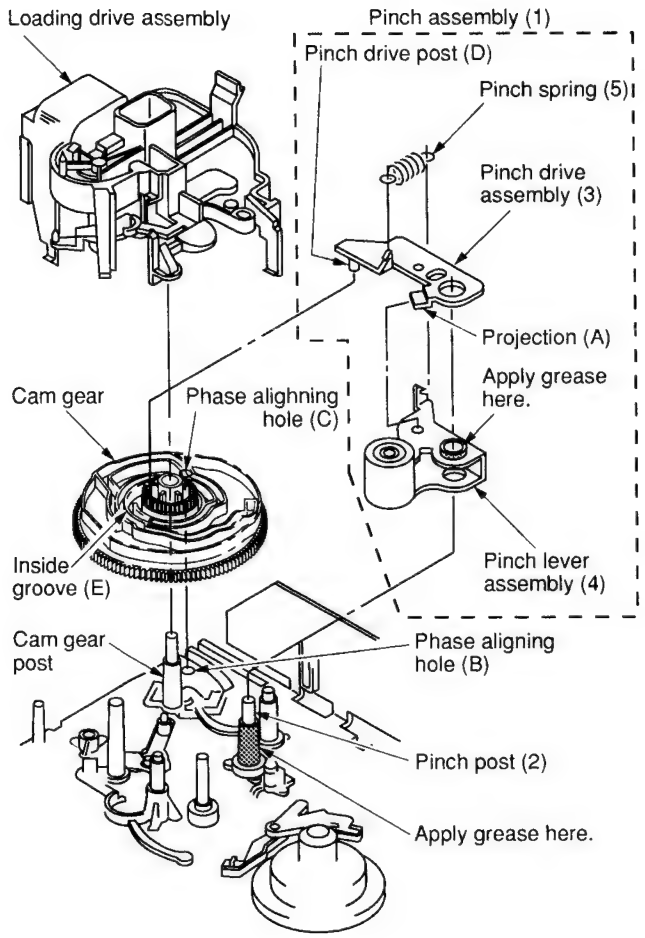


Fig. 6-18-1

Note:

- For the removal and assembling of the loading drive assembly, refer to item 1-6-26.
- When inserting the pinch assembly (1) into the pinch post (2), insert it so that the pinch drive post (D) enters the groove (E) inside the cam gear.
- Take care not to touch the surface of the pinch roller and the grease is not stained on it.
- Be sure to apply grease to the surface of the bar-ring on the pinch lever assembly (4) and the pinch post (2) on the mechanical deck.

1-6-19. No. 9 Guide Lever Assembly Replacement

1. Remove the loading drive assembly. (Refer to item "1-6-26. Loading Drive Assembly Replacement".)
2. Remove the drive lever. (Refer to item "1-6-37. Drive Lever Replacement".)
3. Remove the pinch assembly. (Refer to item "1-6-18. Pinch Roller Assembly Replacement".)
4. Remove the ACE head assembly. (Refer to item "1-6-13. ACE Head Assembly Replacement".)
5. Remove the cam gear (2) from the cam gear post (1).
6. Remove the T soft brake spring (3).
7. Remove the No. 9 guide lever assembly (4) lifting the No. 9 guide lever assembly upward from the No. 9 guide post (5).
8. After replacing, mount the parts in the reverse order of removal.
9. After completion of the replacement, perform the tape transport adjustment.

Note:

- When mounting the No. 9 guide lever assembly (4), confirm that (A) side of the No. 9 guide lever assembly (4) touches the capstan motor housing portion.
- After inserting the No. 9 guide lever assembly (4) into the No. 9 guide post (5), confirm that the lower projection of the No. 9 guide lever assembly (4) touches to the upper surface of the mechanical deck.
- Take care that the grease is not stained on the No. 9 guide post of the No. 9 guide lever assembly (4).
- Be sure to apply grease to the No. 9 guide post (5).

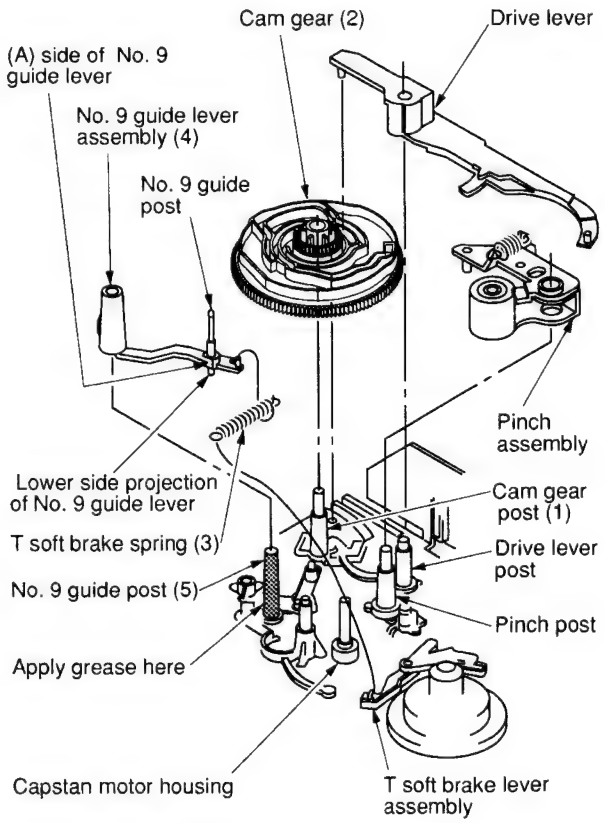


Fig. 6-19-1

1-6-20. Tension Lever Assembly, Band Holder and Band Brake Replacement

1. Remove the tension spring (1).

Note:

- Take care not to extend or deform the tension spring.

2. After setting the band brake adjuster to the band holder assembling position, undo the claw of the snap-fit type and remove the band holder from the band brake adjuster by lifting it upward.

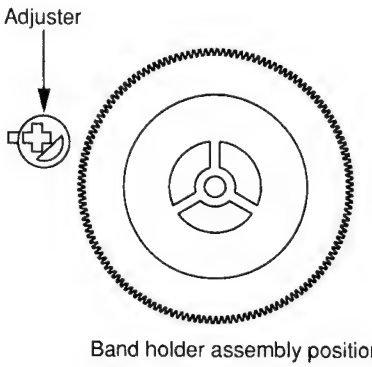


Fig. 6-20-1 Detail of band holder assembling

3. Undo the claw of the outsert on the mechanical deck catching the shaft of the tension lever assembly (3) and remove the tension lever assembly lifting it upward.
4. Remove the band brake (5) from the reel table while pulling the S soft brake lever (4) in the direction shown by the arrow.
5. Remove the band brake (5) from the hook on the tension lever assembly (3).

Note:

- Take care not to contaminate, bend or damage the felt surface on the band brake (5).

6. After replacing the tension lever assembly (3), clean the shaft on the tension lever and apply a few amount of oil.
7. Mount the parts in the reverse order of the removal.
8. After mounting, check the tension post position and perform the adjustment and back tension check.
9. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment.

Note:

- The band holder (2) can be replaced in the procedures described above steps 1 to 3.
- The band brake (5) can be replaced in the procedures described above steps 1 to 5.
- When replacing the band holder (2) and band brake (5), the linearity adjustment is not necessary.

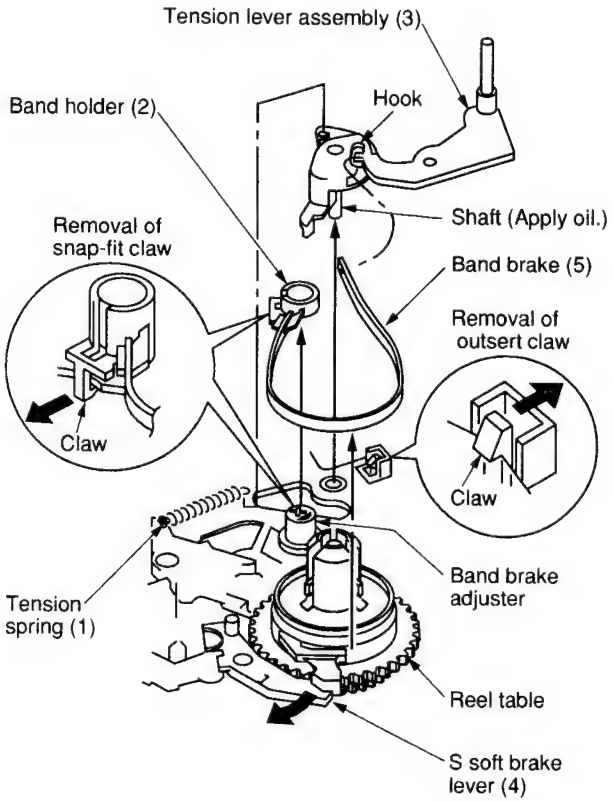


Fig. 6-20-2

1-6-21. S,T Loading Assembly Replacement

1. Remove the mechanical deck assembly from the main PC board.
2. Set the mechanical position to the F/L out position (front side). Turn over the mechanical deck.
3. Remove the loading slider assembly. (Refer to item "1-6-22. Loading Slider Assembly Replacement".)

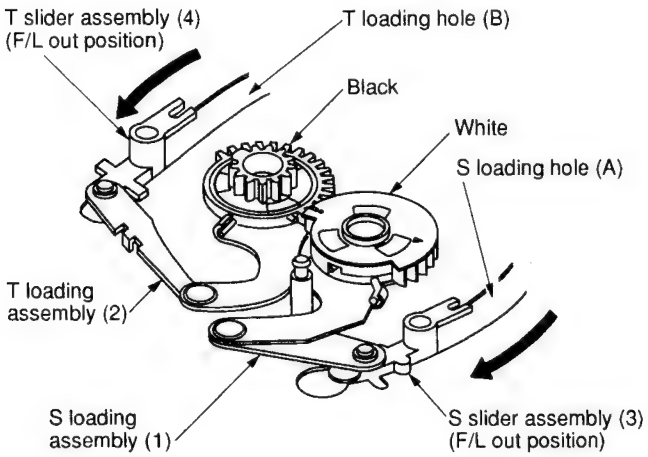


Fig. 6-21-1

4. Remove the S, T loading assemblies (1), (2).
5. Insert the S, T slider assemblies (3), (4) along the cutout of the S, T loading holes (A) and (B) on the mechanical deck and set the S, T slider assemblies (3), (4) to the loading position (rear side).
6. Insert the T loading assembly (2) to the post (C) on the T slider assembly (4) and the post (D) on the mechanical deck. And insert the S loading assembly (1) to the post (E) on the S slider assembly (3) and the post (F) on the mechanical deck.

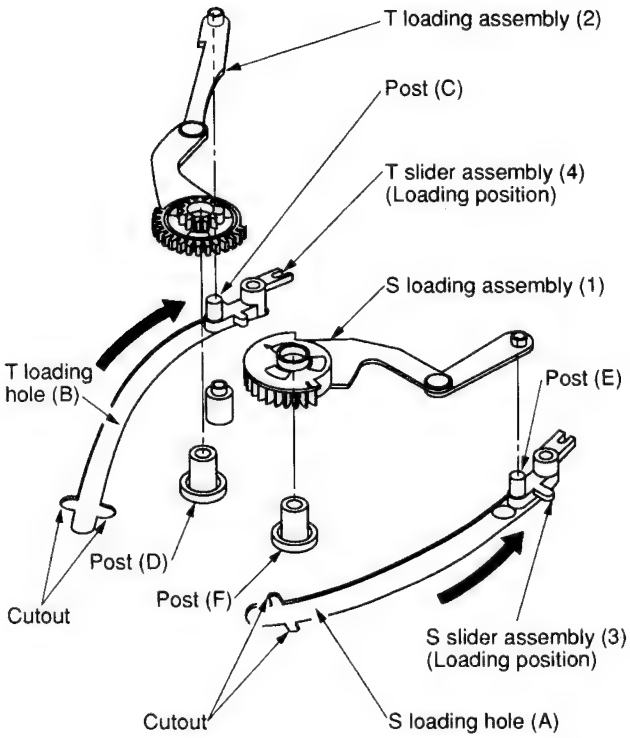


Fig. 6-21-2

Note:

- Align the phases of the ▲ marks on the S, T loading gear (1), (2).

7. Set the S, T slider assemblies (3), (4) to the F/L out position.

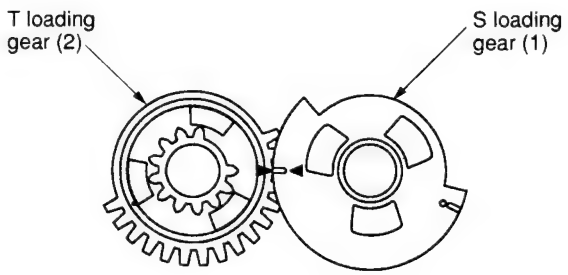


Fig. 6-21-3

1-6-22. Loading Slider Assembly Replacement

1. Remove the mechanical deck from the main PC board.
2. Set the mechanical position to the F/L out position.
3. Turn over the mechanical deck.
4. Remove the stop ring (1).
5. Remove the loading slider assembly (2) while lifting its tip upward using the mold portion on the loading slider assembly (2) as a fulcrum.
6. Mount the parts in the reverse order of removal.

Note:

- When mounting the loading slider assembly (2), insert the tip of the loading slider assembly (2) slightly to the mold portion, then mount it so that the claw on the outsert is in the position of the cutout portion of the loading slider assembly.
- Confirm that the position mark on the loading slider assembly (2) and the mark on the T loading gear match each other in position.

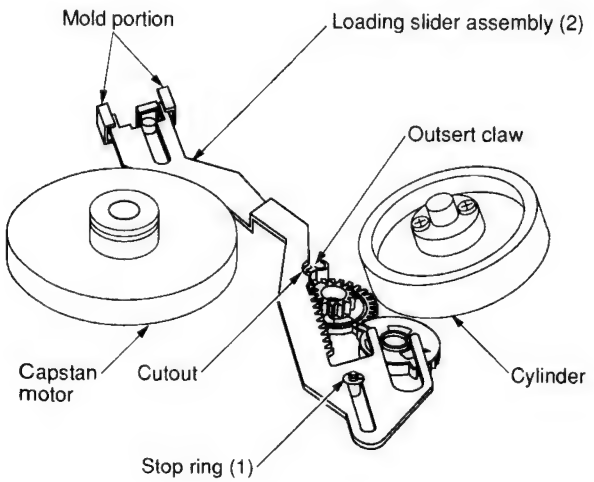


Fig. 6-22-1 View from Mechanical deck bottom side

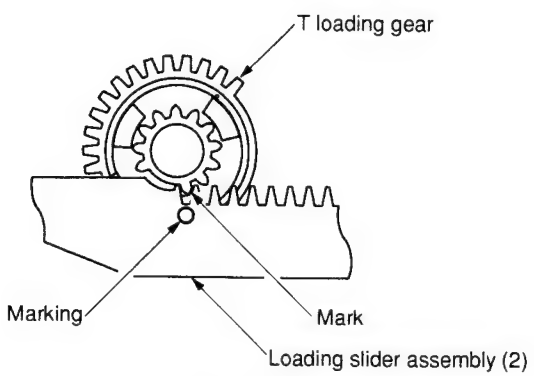


Fig. 6-22-2

1-6-23. Hook Lever Assembly Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Replacement".)
3. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
4. Remove the tension spring (1).
5. Turn the hook lever assembly (2) counterclockwise slightly, and remove the claw on the hook lever assembly (2) then replace.
6. After replacing the hook lever assembly (2) , insert the (A) portion of the hook lever under the S reel table assembly. When the portions (B), (C), (D) are in line, push the claw into the mechanical deck.

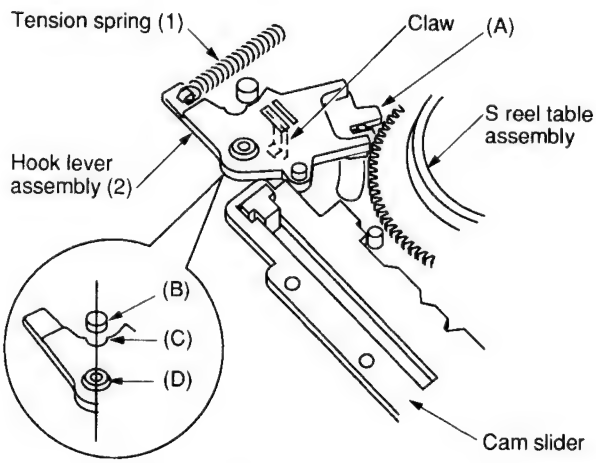


Fig. 6-23-1

7. Turn the hook lever assembly (2) clockwise till it stops, and mount the tension spring (1). After replacing the hook lever assembly (2), slide the cam slider in the direction shown by the arrow, and then position the boss (E) under the cam slider.

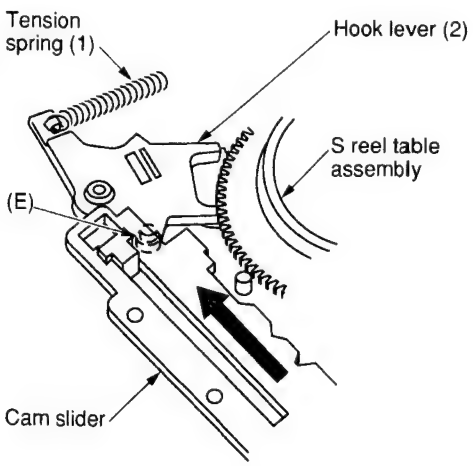


Fig. 6-23-2

1-6-24. Hook Replacement

1. Remove the hook lever assembly. (Refer to item "1-6-23. Hook Lever Assembly Replacement".)
2. Turn over the hook lever assembly (1) and remove the hook lever assembly (1) opening the portion (A) of the hook (2) slightly and lifting the hook (2) upward.
3. When mounting a new hook, push the hook (2) in the portion (B) from above.

Note:

- Take care not to confuse the mounting direction of the hook (2).

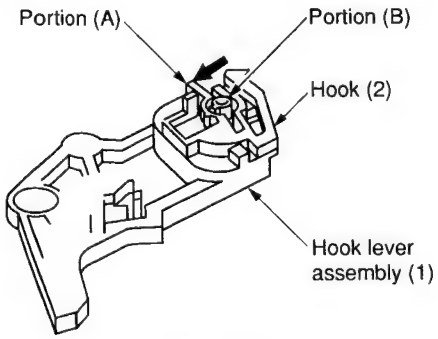


Fig. 6-24-1

1-6-25. Tension Drive Lever Replacement

1. Remove the cam slider. (Refer to item "1-6-38. Cam Slider Replacement".)
2. Turn over the mechanical deck and remove the tension drive lever (1) from the projection (A) moving counterclockwise slightly.
3. After replacing the tension drive lever (1) , mount in the reverse order of removal.

Note:

- For the cam slider mounting, refer to the notes in item 1-6-38.

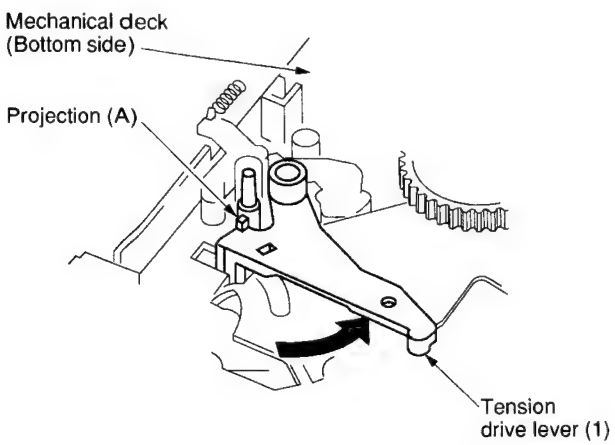


Fig. 6-25-1

1-6-26. Loading Drive Assembly Replacement

1. Remove the F/L ground plate and the head cleaner assembly. (Refer to item "1-6-11. Head Cleaner Assembly Replacement".)
2. Remove two flat cables (1) from the connectors.
3. Pull out the portion (A) (No. 8 guide cap) from the motor bracket (2).
4. Remove four claws (a), (b), (c), (d) securing the motor bracket in the order of (a) → (b) → (c) → (d).

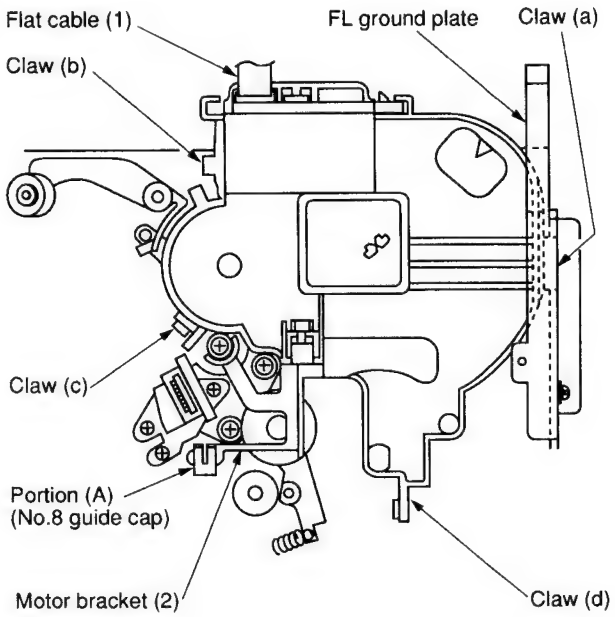


Fig. 6-26-1

Note:

- Remove the claw (a) inserting a driver.
- Remove the claws (b) and (c) pushing inside previously and opening the claws slightly.

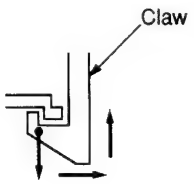


Fig. 6-26-2

<Preparation for Loading drive assembly mounting >

a) Confirm that the head cleaner assembly is removed.

b) Confirm that the small hole b) on the cam gear aligns with the hole on the mechanical deck.

c) Confirm that the clearance between the pinch lever assembly and the cam gear is approx. 0.3 mm. (Confirm that the pinch lever assembly is correctly mounted on the groove of the cam gear.)

d) Confirm that the clearance between the drive lever and the cam gear is approx. 2 mm. (Confirm that the drive lever is correctly mounted on the groove of the cam gear.)

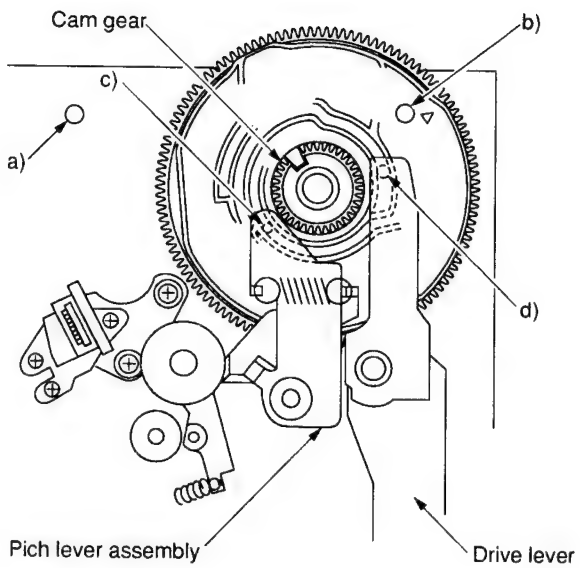
e) Confirm that the Δ mark on the rotor of the cam switch aligns with the Δ mark on the motor bracket.

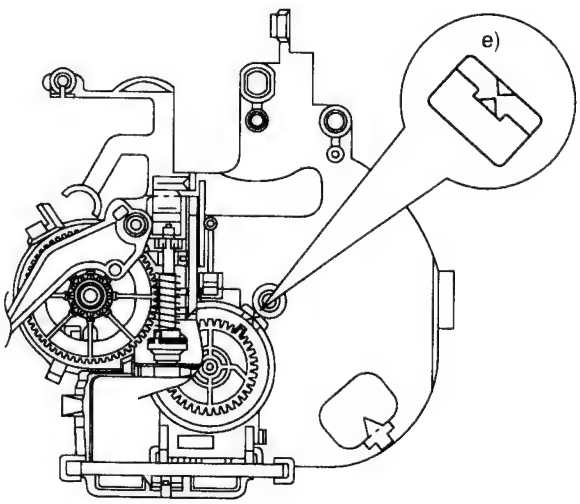
5. After completion above steps a) to e), mount the loading drive assembly. Push four claws to the motor bracket in the order of (d) → (c) → (b) → (a) and push the portion (A) (No. 8 guide cap) into the motor bracket.

6. Confirm that the Δ mark on the rotor of the cam switch aligns with that on the bracket when the hole b) on the cam gear aligns with the hole on the mechanical deck. If the alignment of the Δ marks cannot be confirmed, remove loading drive assembly once again and reinstall after confirming the above steps a) to e).

7. Mount two flat cables.

8. Mount the F/L ground plate and the head cleaner assembly.



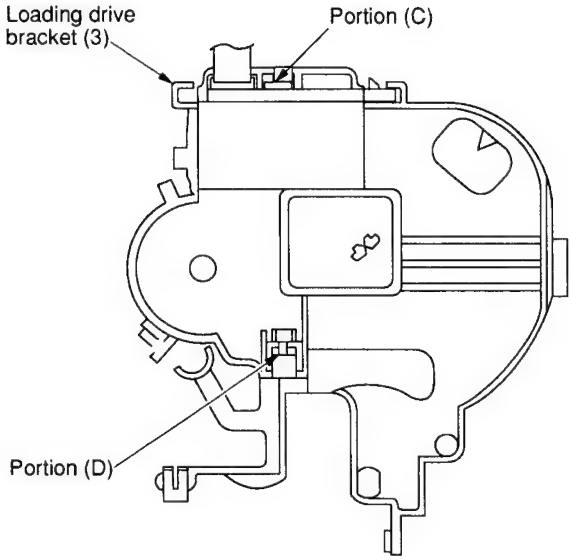


Loading drive assembly bottom side

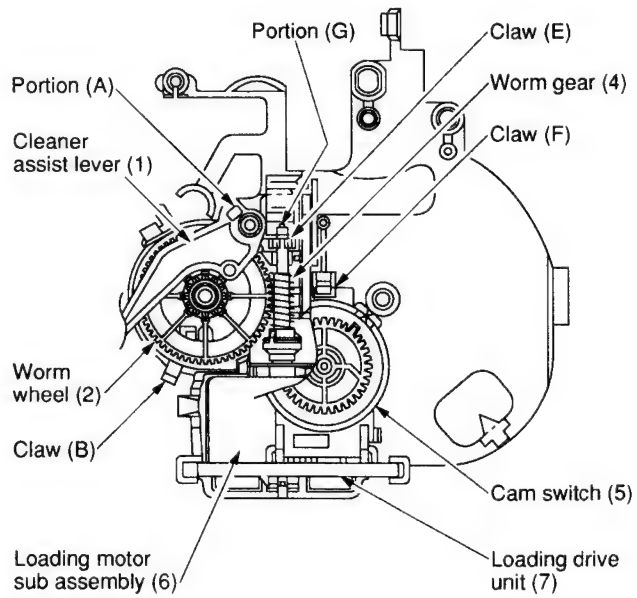
Fig. 6-26-3

1-6-27. Loading Motor Sub Assembly, Cam Switch and Loading Drive Unit Replacement

1. Remove the loading drive assembly. (Refer to item "1-6-26. Loading Drive Assembly Replacement".)
2. Remove the cleaner assist lever (1) from the claw (A).
3. After removing the cleaner assist lever (1), the worm wheel can be also removed upward.
4. Insert a slot-type screwdriver into the portion (C) of the loading drive bracket (3) and push the loading motor 2 – 3 mm lower. And push the tip of worm gear from the portion (D) of the loading bracket (3), then remove the worm gear (4) from the claw (E).
5. Remove the cam switch (5) from the claw (F) on the loading drive bracket (3) and pull out the loading drive unit (7) and the worm gear (4) simultaneously.
6. Replace the loading drive unit (7). When mounting the PC boards of the cam switch (5) and the loading drive unit (7), take care that no clearance is allowed.
7. Insert the loading drive unit (7) and the worm gear (4) into the loading drive bracket (3).
8. Push the tip (G) of the worm gear (4) into the claw (E) on the loading motor bracket.
   In this process, take care not to bend the tip of the worm gear with strong pressure.
9. Push the cam switch (5) into the claw (F) on the loading motor bracket.
10. Mount the parts in the reverse order of removal.



Loading drive assembly (Top Side)



Loading drive assembly (Bottom side)

Fig. 6-27-1

1-6-28. Cam Gear Replacement

1. Remove the loading drive assembly. (Refer to item "1-6-26. Loading Drive Assembly Replacement".)
2. Remove the cam slider. (Refer to item "1-6-38. Cam Slider Replacement".)
3. Remove the drive lever. (Refer to item "1-6-37. Drive Lever Replacement".)
4. Remove the pinch roller assembly. (Refer to item "1-6-18. Pinch Assembly Replacement".)
5. Remove the cam gear.
6. Apply grease on a new cam gear on the shaded portion as shown in Fig. 6-28-1 and the shaft of the main base.

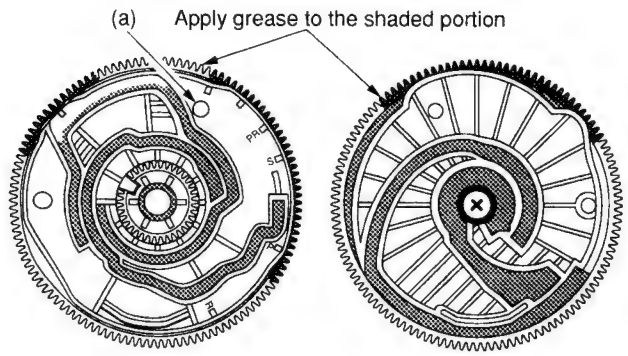


Fig. 6-28-1

7. Make the S, T slider to the slot out condition.
8. Push the cam lever (1) and the pin (2) (loading slider) in the direction shown by the arrows (A) and (B).
9. Mount the cam gear at the angle which the small hole (a) on the cam gear aligns with the hole on the mechanical deck. (Refer to Fig. 6-28-1.)

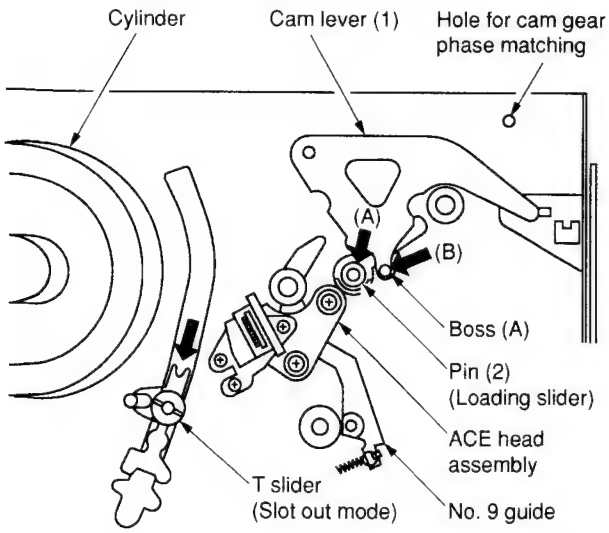


Fig. 6-28-2

10. Mount the parts in the reverse order of removal.

1-6-29. S Reel Table Assembly and Washer 2 Replacement

1. Remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
2. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-38. Cam Slider Replacement".)
4. Remove the S soft brake and S main brake assembly. (Refer to item "1-6-35. S Soft Brake Replacement and 1-6-34. S Main Brake Assembly Replacement".)
5. Remove the tension lever assembly. (Refer to item "1-6-20. Tension Lever Assembly Replacement".)
6. Remove the S reel table assembly (1) pulling it out upward.
7. Remove the washer 2 (2).
8. After cleaning the reel shaft (3) with a cleaning kit, insert a new washer 2 (2) to the reel shaft (3) and apply a drop of oil to the shaded portions (two locations) on the reel shaft (3).
9. After replacing, mount the parts in the reverse order of removal.
10. Confirm the reel torque using a torque cassette.

Note:

- The washer 2 (2) can use repeatedly.

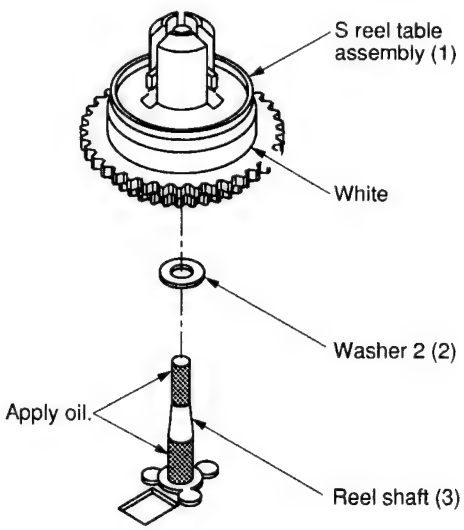


Fig. 6-29-1

1-6-30. T Reel Table Assembly and Washer 2 Replacement

1. Remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
2. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
3. Remove the T soft brake and T main brake assembly (Refer to item "1-6-38. Cam Slider Replacement".)
4. Remove the T reel table assembly (1) pulling it out upward.
5. Remove the washer 2 (2).
6. After cleaning the reel shaft (3) with a cleaning kit, insert a new washer 2 (2) to the reel shaft (3) and apply a drop of oil to the shaded portions (two locations) on the reel shaft (3).
7. After replacing, mount the parts in the reverse order of removal.
8. Confirm the reel torque using a torque cassette.

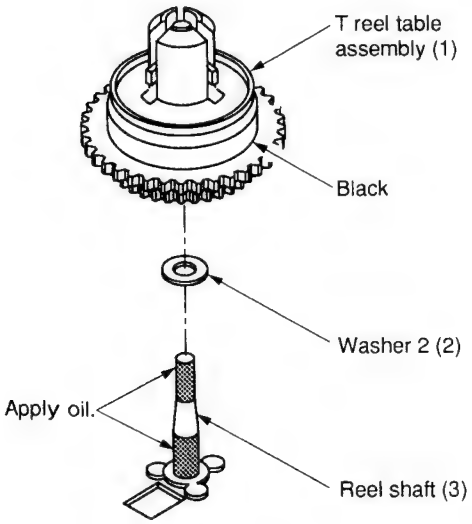


Fig. 6-30-1

Note:

- Washer 2 (2) can use repeatedly.

1-6-31. Idle Arm Assembly Replacement (Center Gear Pulley, Idle Kick Lever, Idle up/down Lever)

1. Remove the mechanical deck from the main PC board.
2. Remove the stop ring (1) turning over the mechanical deck.
3. Remove the center gear pulley (2) lifting it upward.
4. Remove the claw (A) on the idle kick lever (3) moving and pulling it upward.
5. Remove the slit washer (4).
6. Remove the idle up/down lever (5) and the idle arm (6) simultaneously from two claws (B) on the mechanical deck.
7. After cleaning the center gear post (7) using a cleaning kit, apply a few drops of oil to the shaded portion on the center gear post.
8. Mount the parts in the reverse order of removal.

Note:

- Stop ring (1) is impossible to use again.
- When mounting the parts, take care of the notice shown in Fig. 6-31-2.

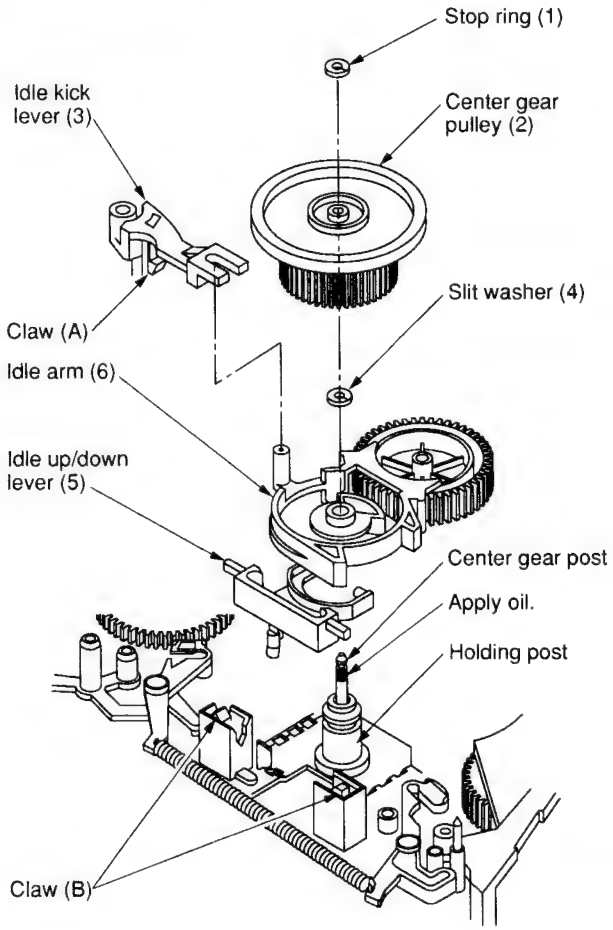


Fig. 6-31-1

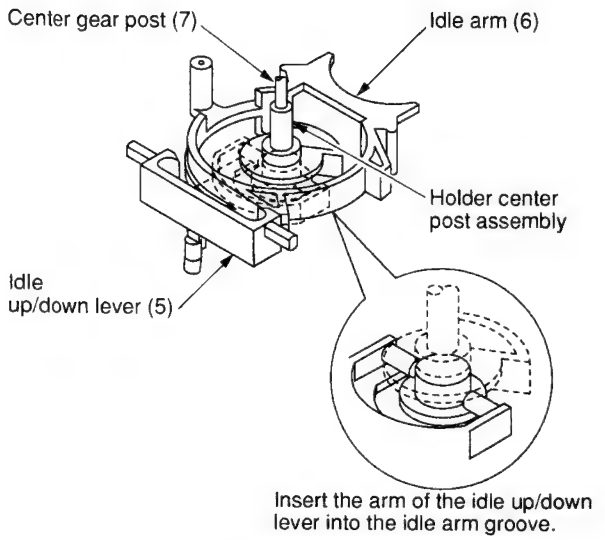


Fig. 6-31-2

1-6-32. Holder Center Post Assembly Replacement

1. Turn over the mechanical deck and remove the center gear pulley and the idle arm. (Refer to item "1-6-31. Idle Arm Assembly Replacement".)
2. Turn over the mechanical deck and remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Assembly Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
4. After removing two screws (1), replace the holder center post assembly (2).
5. After replacing, mount the parts in the reverse order of removal.

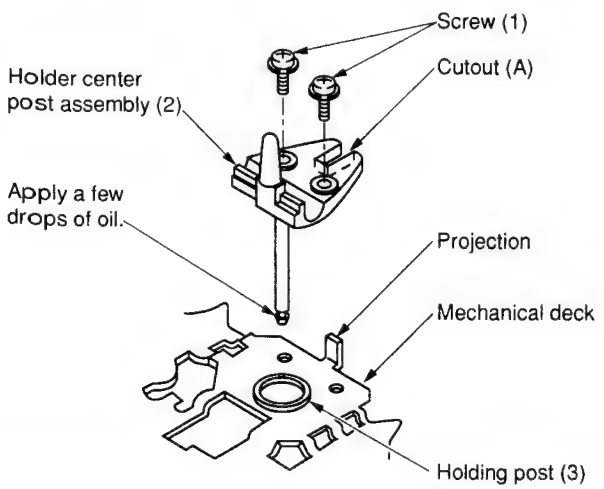


Fig. 6-32-1

Note:

- When mounting, push the cutout (A) on the holder center post assembly (2) aligning with the projection on the mechanical deck.
- Screw tightening torque is 294 – 392 mN•m (3 – 4 kg•cm).
- Before mounting the center gear pulley, apply a few drops of oil. (Refer to Fig. 6-31-1.)

1-6-33. REC Inhibiting Lever Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-38. Cam Slider Replacement".)
4. Remove the tension spring (2).
5. Undo the claw (A) on the S soft brake (1) sliding and lifting it upward.
6. Remove the projection (B) on the REC inhibiting lever (3) sliding in the direction shown by the arrow and lifting it upward.
7. After replacing the REC inhibiting lever (3), mount the parts in the reverse order of removal.

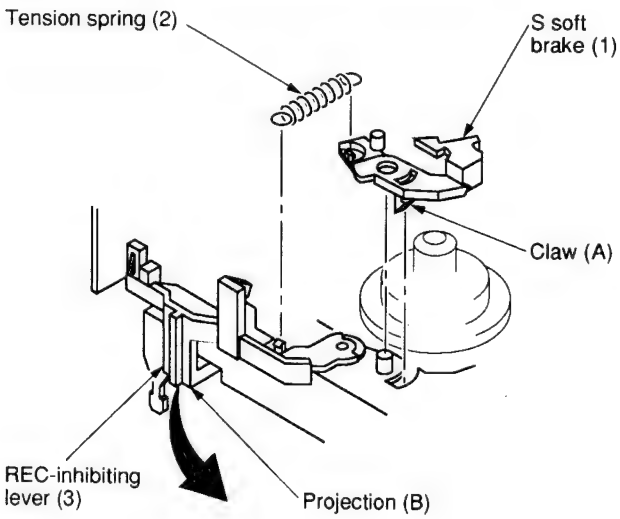


Fig. 6-33-1

1-6-34. S, T Main Brake Assembly Replacement

1. Remove the mechanical deck from the main PC board and turn the mechanical deck upside down.
2. When replacing the T main brake assembly (2), first remove the idle kick lever (3). (Refer to item "1-6-31. Idle Arm Assembly Replacement".)
3. Remove the tension spring (4).
4. Remove the claws on the S, T main brakes (1), (2) from the mechanical deck lifting the S, T main brakes (1), (2) upward.
5. After replacing the S, T Main brake assemblies (1), (2), mount the parts in the reverse order of removal.

Note:

- When mounting the S, T main brake assemblies (1), (2) take care that both ends of the S, T main brakes (1), (2), do not touch the gear of the reel table.

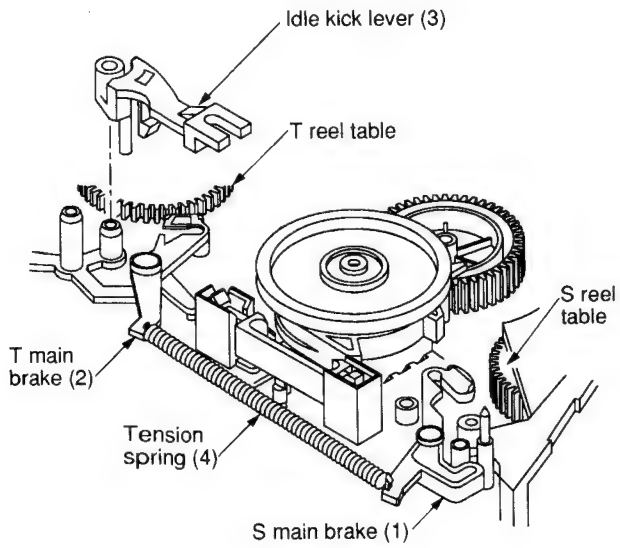


Fig. 6-34-1

1-6-35. S Soft Brake Replacement

1. Remove the cam slider. (Refer to item "1-6-38. Cam Slider Replacement.")
2. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
3. Remove the S soft brake spring (1).
4. Remove the S soft brake (2) after removing the claw (A) on the S soft brake from the mechanical deck.

Note:

- When mounting the S soft brake spring (1), take care not to deform the hook (B).
- When mounting the S soft brake (2), take care of the band brake (3).

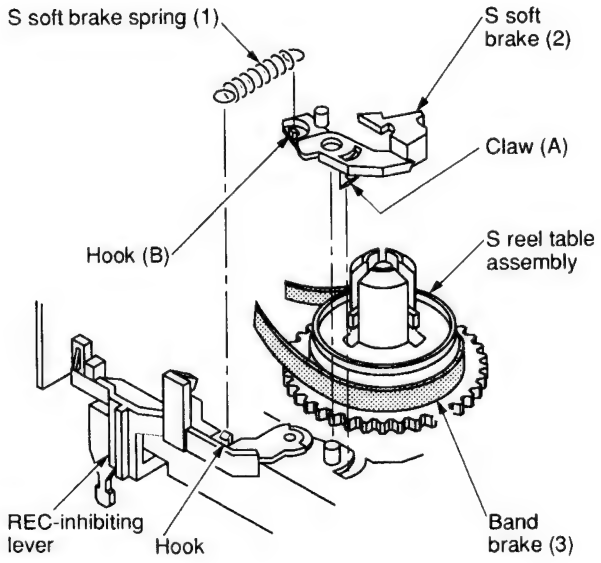


Fig. 6-35-1

1-6-36. T Soft Brake Replacement

1. Remove the T soft brake spring (1).
2. Remove the claw (A) on the T soft brake (2) from the mechanical deck and remove the T soft brake (2).
3. After replacing the T soft brake (2), mount the parts in the reverse order of removal.

Note:

- When mounting the T soft brake spring (1), take care not to deform the hook (B).
- Take care not to touch the surface (C) on the brake pad.

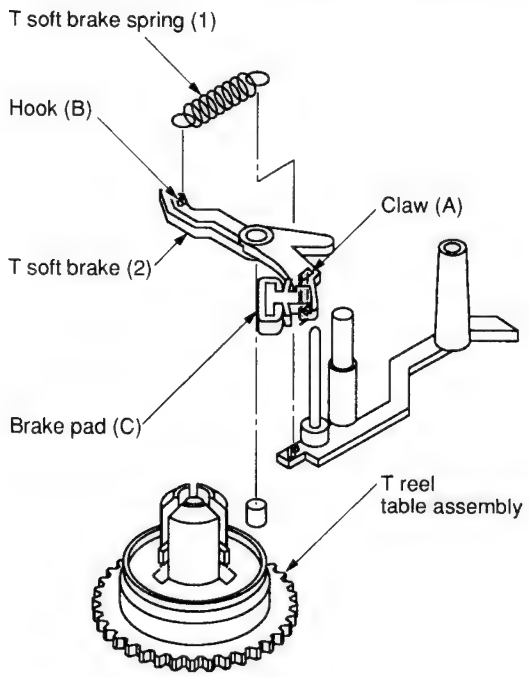


Fig. 6-36-1

1-6-37. Drive Lever Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
4. Remove the cam slider. (Refer to item "1-6-38. Cam Slider Replacement".)
5. Remove the Loading Drive Assembly. (Refer to item "1-6-26. Loading Drive Assembly Replacement.")
6. Remove the drive lever (1).
7. After replacing the drive lever (1), mount the parts in the reverse order of removal.

Note:

- Be sure to align the phase of the cam gear (2). (Refer to item 1-6-38. Cam Slider Replacement".)
- Mount the drive lever (1) so that it is positioned between the mark (A) on the mechanical deck and the outsert (B).
- Apply grease to the surface between the mark (C) on the mechanical deck and the drive lever shaft (D).

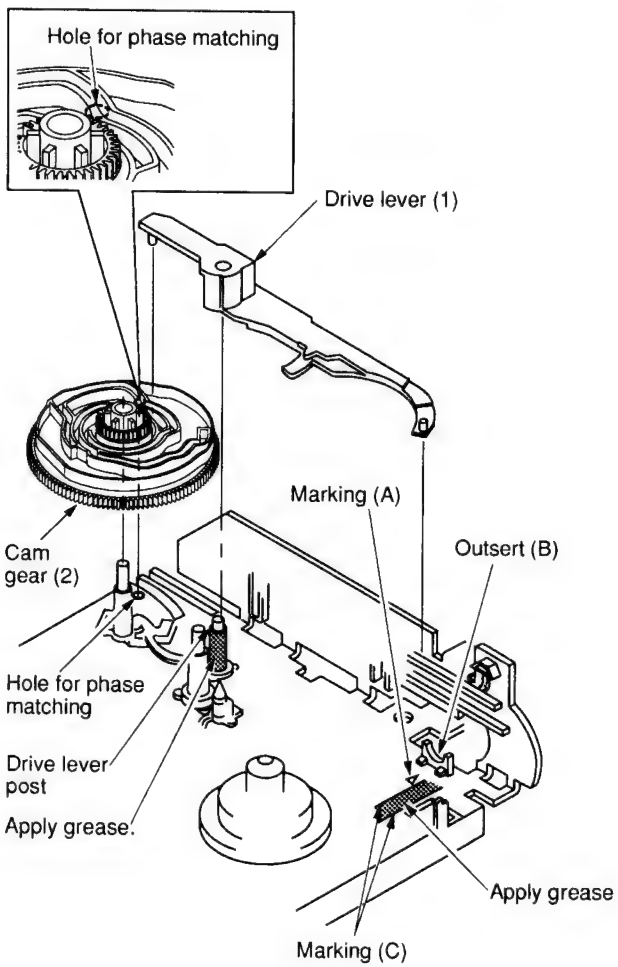


Fig. 6-37-1

1-6-38. Cam Slider Replacement

1. Remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
2. Remove the tension spring (1).
3. Turn the hook lever assembly (2) counterclockwise and turn the S soft brake (3) counterclockwise.
4. Move the cam slider (4) to the right and align the projection (A) on the mechanical deck and the cutout portion (B) on the cam slider (4).
5. Remove the claw (C) on the cam slider (4) and remove the cam slider (4) lifting the cam slider (4) upward.

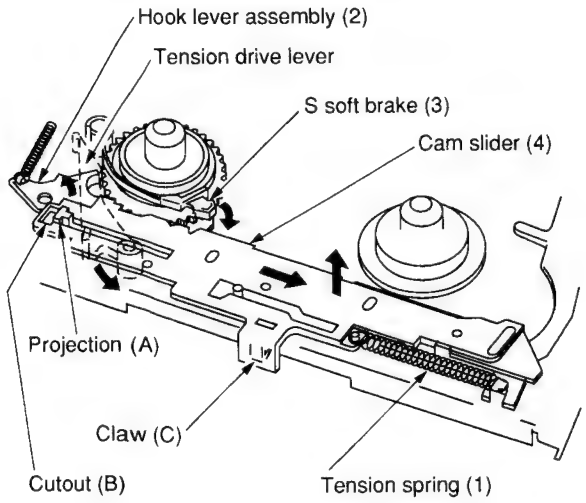


Fig. 6-38-1

6. Apply grease on the shaded portion of a new slider for the replacement.
7. Mount the parts in the reverse order of removal. After inserting the cam slider, slide it to the left direction till it stops. (Fig. 6-23-2 shows this condition.)

Note:

- When mounting the cam slider (4), slide the tension drive lever in the direction shown by the arrow (counterclockwise).
- After completion of the replacement, confirm that the cam slider (4) can slide to left and right directions smoothly.

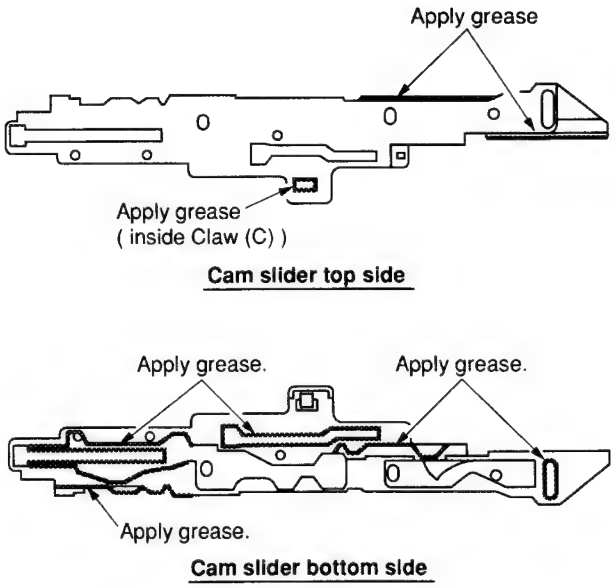


Fig. 6-38-2

1-6-39. Idle Centering Lever Replacement

1. Remove the cam slider. (Refer to item "1-6-38. Cam Slider Replacement".)
2. Remove the claw on the idle centering lever (1) and remove the idle centering lever (1) lifting it upward.
3. After replacing the idle centering lever (1), mount the part in the reverse order of removal.

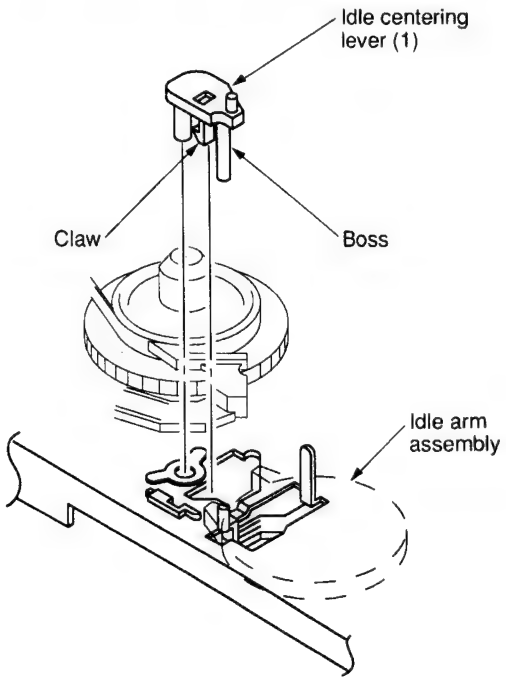


Fig. 6-39-1

1-6-40. Capstan Motor Replacement

1. Remove the reel belt (1).
2. Remove one screw (2) from the bottom of the mechanical deck, and remove the PC board (3).

Note:

- Take care not to misuse the screw with others.

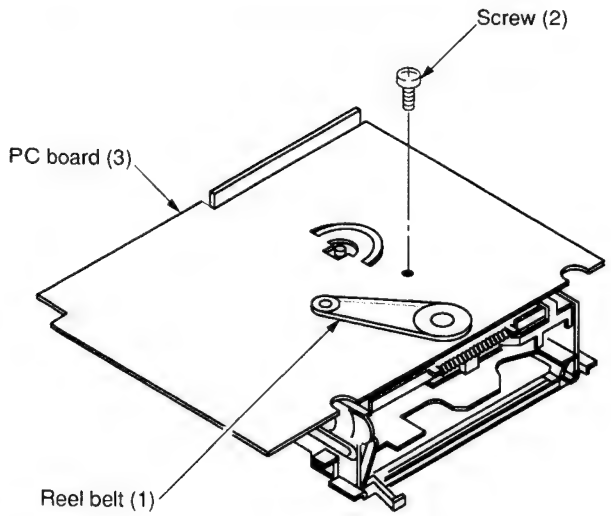


Fig. 6-40-1

3. Remove the capstan motor (4) after removing three screws (5).

Note:

- Take care not to drop the capstan motor.

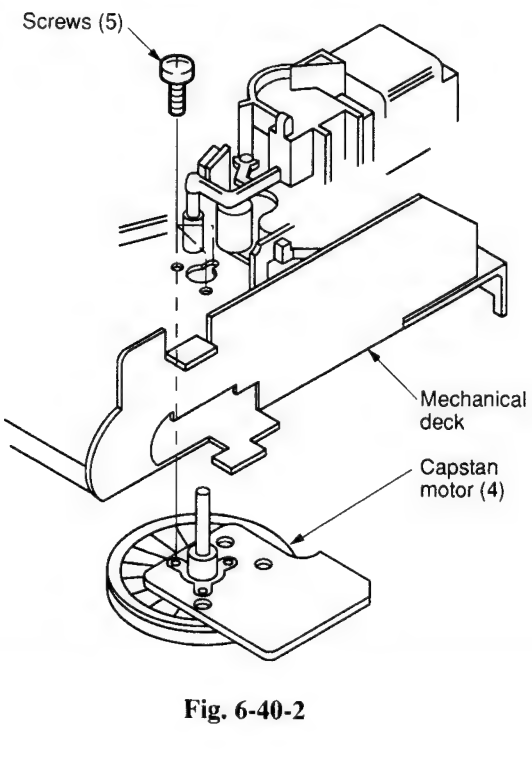


Fig. 6-40-2

4. Take care not to damage and scratch the motor itself, and mount the capstan motor (4) fitting the hole (A) on the mechanical deck and the hole (B) on the capstan motor (4).

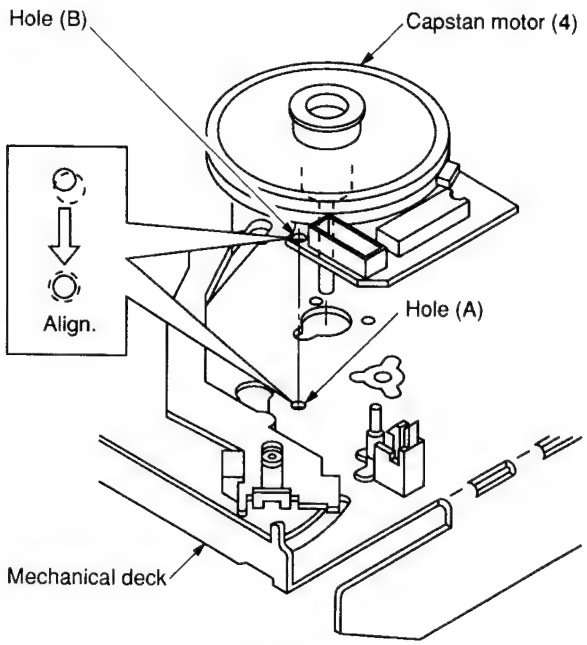


Fig. 6-40-3

5. Mount the capstan motor (4) with three screws (5) viewing from the top side of the mechanical deck.

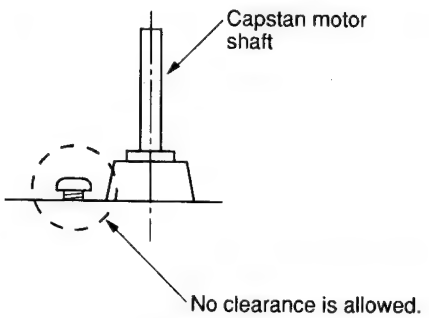


Fig. 6-40-4

Note:

- Do not use once-removed screws again.
- Take care that no clearance is allowed when securing three screws.

6. After replacement, mount the parts in the reverse order of removal.

Note:

- In this case, take care not to twist the reel belt and stick the grease or etc. on it.

7. After replacing, perform the adjustment according to the tape transport adjustment procedures.

1-6-41. S-VHS Switch Assembly Replacement (S-VHS model only)

1. Slide the cassette holder assembly (1) until the screw (2) can be seen from the hole on the top bracket (3).
2. Insert a screwdriver from the hole provided on the top bracket (3) and secure the screw (2).
3. Remove the S-VHS switch assembly (4) upward.
4. After completion of the replacement, mount the parts in the reverse order of removal.

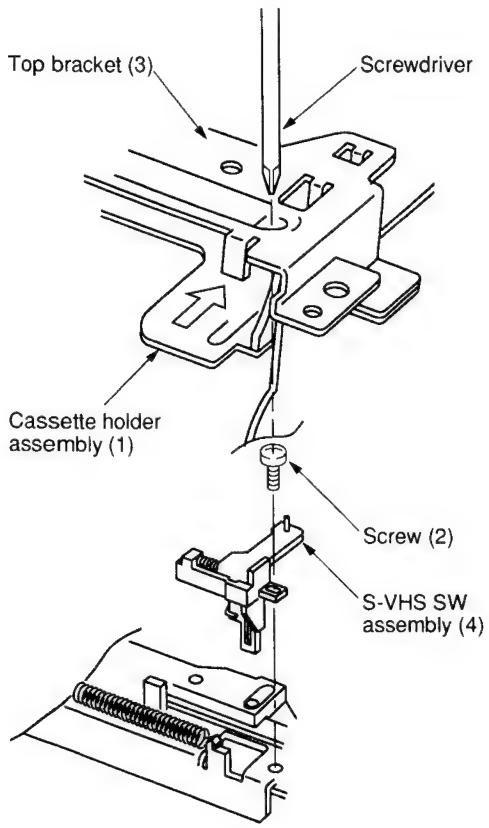


Fig. 6-41-1

1-7. Check and Adjustment

1-7-1. Check of Tension Pole Position

1. Turn the worm wheel counterclockwise after removing the cassette holder assembly on the front loading mechanism, and set the cam gear at playback position.
2. Turn the S reel table assembly (1) clockwise slowly.
3. Adjust the adjuster (3) counterclockwise from the position shown in Fig. 6-20-1 so that the clearance between the left end of the tension lever assembly (2) and the left side of the mechanical deck becomes 7.5 ± 1 mm.

Note:

- There is a long mark at the position of 7.5 mm from the round surface of the mechanical deck. Make sure the position of the mark when adjusting.

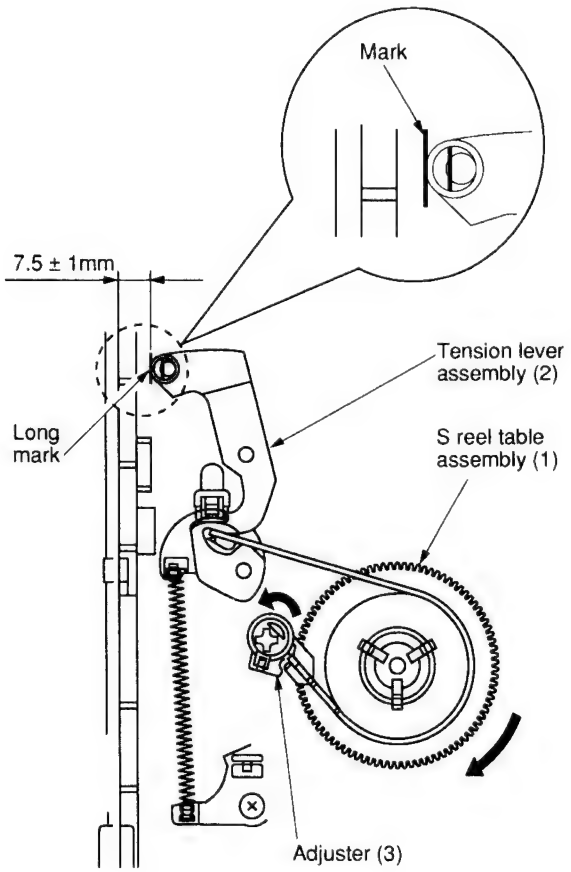


Fig. 7-1-1

1-7-2. Reel Torque Check

(1) Reel torque

1. REVIEW mode (supply side)

   Poor torque may not wind the tape. On the other hand, excessive torque will cause damage to the tape during REVIEW mode.

2. Record/Playback mode (take-up side)

   Too little torque does not rewind the tape to the end. If too large torque, the tape may be stretched by excessive tension.

3. Inspection

   Rewind the torque cassette to the end, then check the torque values shown below:

Review	15.95 ± 3.65 mN•m (162.5 ± 37.5 g•cm)
Record/Playback	6.85 ± 2.45 mN•m (70 ± 25 g•cm)

   For checking method, refer to the following item (2).

(2) Reel torque and back tension check

1. First, record a TV broadcast program on the entire torque cassette tape (KT-300NR) in the SP mode.
2. Load the torque cassette tape (KT-300NR) in the VTR and feed it forward until the end of the tape, before proceeding with measurement.
3. Set the VTR to the REVIEW mode and feed the tape for about 15s, and then make sure the take-up torque described above is obtained while observing the left torque meter.
4. After completion of step 3), feed forward to tape start position and set the VTR to the PLAY mode and feed the tape for about 30s. Read the right torque meter and check the torque described above is obtained.
5. If the review torque and playback torque are out of limit, replace the clutch assembly.
6. When the S reel table assembly, the T reel table assembly and the idle arm assembly are replaced, perform the reel torque check.

<Precautions for Use of Torque Cassette (KT-300NR)>

1. Before loading a torque cassette in a VTR, always remove tape slack. The tape slack can be removed by rotating the reel to its take-up direction. (The tape tends to slack when there is no reel brake actions.)
2. When the torque cassette is loaded, confirm followings:
   - Make sure the tape does not ride up or over the No. 8 cap. If it does, do not eject the tape but return the tape to its correct position, taking care not to damage the tape.
   - Make sure the tape is not slackened. If slackened, operate the VTR in FF or REW mode and then stop the tape. Then make sure the tape is not slackened again.
   - After above confirmation, proceed to the reel torque adjustment and confirmation.
3. Caution for removal of torque cassette
   - When removing the torque cassette from the VTR, set the VTR to the STOP mode and wait for several seconds. Then, make sure the tape is not slackened. Push the EJECT button to remove the cassette.
4. If the previous precautions 1), 2) and 3) are not performed properly, the tape may be damaged and correct measurements can not be performed.
5. Do not use worn out or damaged tape, if used they may damage video heads on the cylinder. In such a case always replace the tape with a new one. The replacement tape is of E-180, 10 m in length.

1-7-3. Tape Transport System

The tape transport system has been precisely adjusted in the factory, so no check and alignment are necessary except the followings:

- Noises observed on the screen
- Tape damage
- Parts, shown in the adjustment procedures for the tape transport system were replaced.

Electrical signal output terminal required for adjustment differs depending upon the models. Refer to the test point location in the Electrical Adjustment Section.

(1) Location of tape transport adjustment

<Adjustment reference>

Lower flange height of No. 8 guide is used as the basic reference for the transport adjustment. To keep height of the No. 8 guide, do not apply excessive force onto the main base to prevent the main base from deformation.

Rectangles shown in Figs. 7-3-1, 7-3-2 show the adjusting locations.

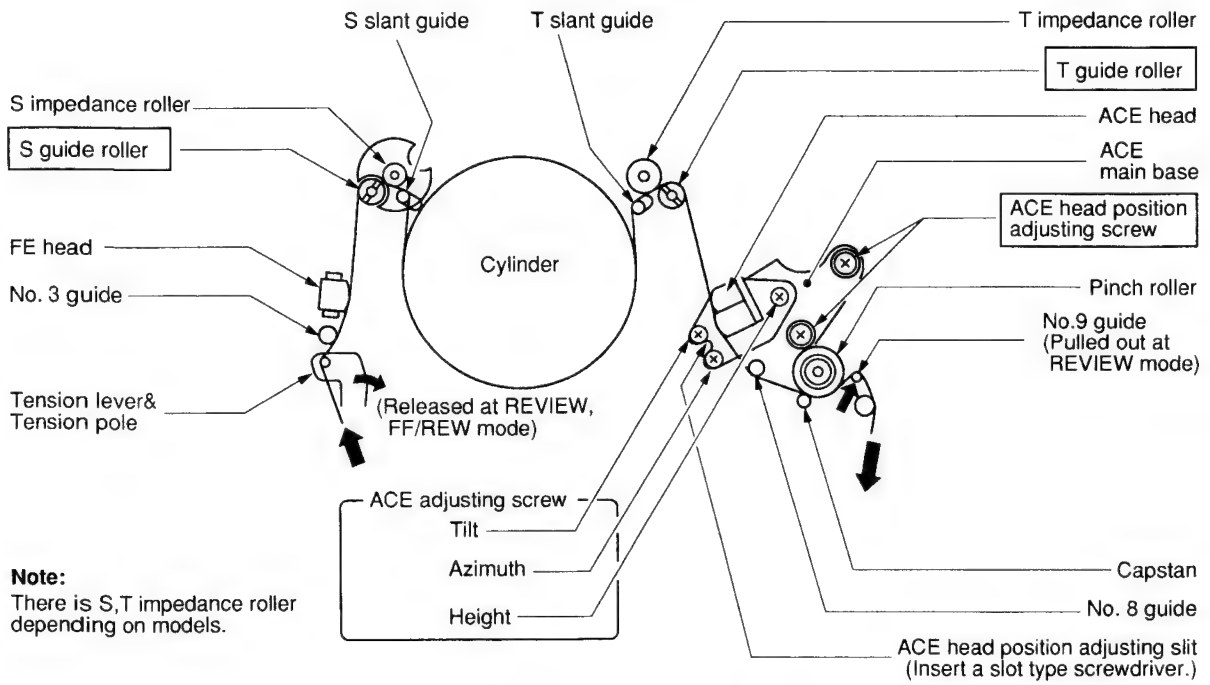


Fig. 7-3-1 Tape travel diagram

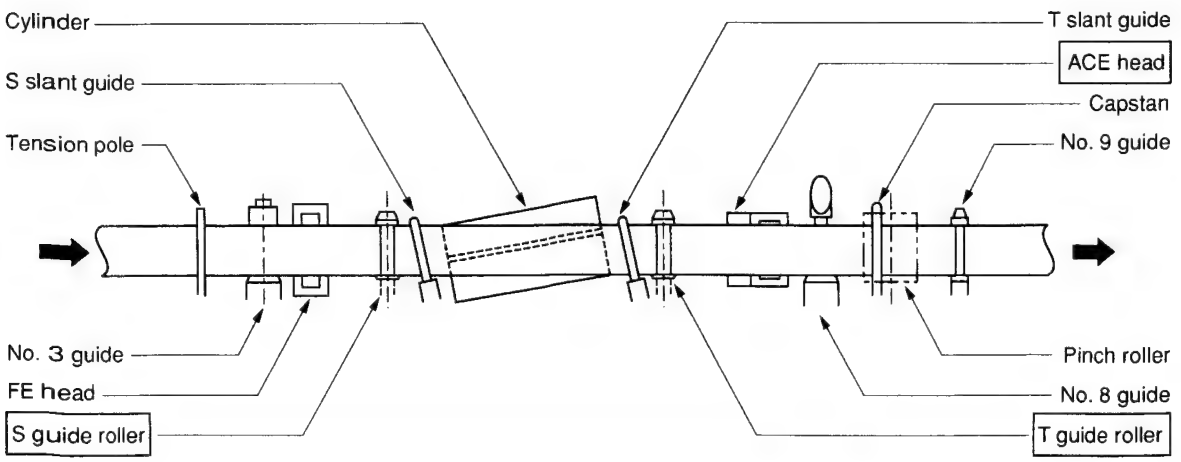


Fig. 7-3-2 Location of tape transport adjustment

(2) Tape transport system adjustment flow chart

5) No. 9 guide lever check

6) Check for transitional operation

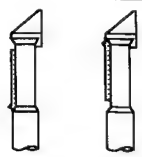
7) Recorded & reproduced envelope check

8) Tape damage check

9) Checks for Hi-Fi models only. AFM envelope output max. point check

1. TAPE WRINKLE CHECK

- Playback E-240 tape in Review mode.
- Confirm the portion of upper/lower flange on No.8 guide.

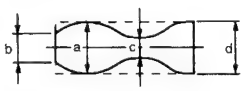


2. NO. 9 GUIDE

If tape travels out of upper/lower flange as shown above, pinch lever or capstan motor or No.9 guide lever is defective.
Replace the defective part(s).

1. Playback 3 MHz video signal (LP mode) in alignment tape and set review mode.
2. Change mode from review to play and check entrance side envelope rises within 3s.
   Check entrance side envelope rised within 3s, when mode is changed from slot-in to play.
   OK
   NG
3. Adjust S guide roller to readjust linearity.
4. Check step 2 and 3 if no good, replace S slider assy or tension lever.

- Records signals in SP & LP modes, using E-180, E-240 tape and playback them to check envelopes.



c/a ≧ 0.75
b, d/a ≧ 0.63 } (Non S-VHS model)

b, c, d/a ≧ 0.75 (S-VHS model)

- Run E-240 tape in each mode and check there is no damage at each guide.

Playback 3 MHz video signal. 400 Hz AFM signal in alignment tape ST-C7 in SP mode.

Check video envelope max. point (A ch).

Check control pulse phase difference is within ±3 ms from that point to AFM envelope max. point.

Playback mode

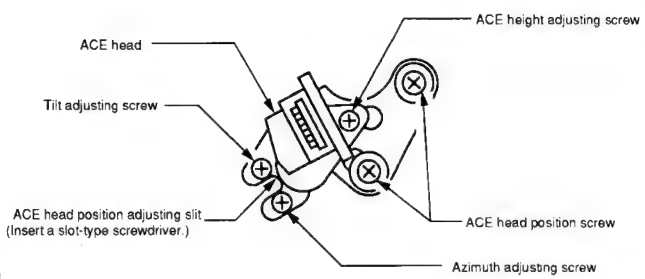
- Guide roller section damage
  - Back to step 3) linearity adjustment. (or Slider assembly replacement)
- Damage at No.8 guide brush
  - Back to step 1) ACE head assembly coarse adjustment. (or Pinch lever replacement)
- Damage at No.1 guide lower flange
  - Back to step 6) cheek for transitional operation. (or Tension lever replacement)

Review

- Damage at No.8 guide flange
  - Back to step 5) No.9 guide lever check or 1) ACE head assembly coarse adjustment. (Pinch lever, No.9 lever, Capstan motor replacement)
- Damage at guide roller section
  - Back to step 3) linearity adjustment. (or Slider assembly replacement)

Frame advance mode

- Damage at No.8 guide flange
  - Back to step 3) linearity adjustment.



6. ACE HEAD POSITION

- Set tracking at its center position pushing channel (tracking) up/down buttons simultaneously.
- Playback 3 MHz video signal (LP mode) on the alignment tape. Slide ACE main base to obtain max. envelope.
- Playback 3 MHz (A ch) video signal (LP mode) on the alignment tape.
  Confirm that difference from tracking center is within 3 ms when maximum envelope is obtained.
- If not, readjust in LP mode.

* VTR applied SP mode only. Use 3 MHz (A ch) video signal (SP mode) instead of 3 MHz video signal (LP mode).

(3) Tape transport system adjustment

<Pre-adjustment>

When the part(s) listed in Table 7-3-1 is replaced, perform required adjustments by referring to procedures for the tape transport system. When the part(s) listed in Table 7-3-1 is replaced, the tape path may be changed and may damage alignment tape. To prevent this, first run a E-240 tape and make sure excessive tape wrinkle does not occur at each tape guide.

1. If tape wrinkle is observed at the S, T guide rollers, turn the S, T guide rollers until wrinkle disappears.
2. If tape wrinkle is observed at the No. 8 guide, perform the tilt adjustment of the ACE head.

Table 7-3-1

Parts replacement	Adjustment procedure
• Cylinder assembly • S, T sliders • ACE head • Pinch lever assembly • Capstan motor • No. 9 guide lever assembly	From item 1)
• Upper cylinder	From item 2)
• S, T guide rollers • Tension lever assembly • FE head	From item 3)
• Reel clutch assembly • S, T reel tables	From item 4)

<Adjustment procedures>

1) ACE head assembly coarse adjustment

a. Audio head height adjustment

1. Play back the tape recorded in the SP mode. Observe the surface of the ACE head.
2. Turn the ACE height adjusting screw so that upper tape edge matches to the upper edge of the audio head core.

b. ACE head tilt adjustment

1. Play back the tape recorded in the SP mode and observe running condition of the tape at the lower flange of No.8 guide.
2. Turn the ACE tilt adjusting screw until tape wrinkle is caused at the lower flange of No. 8 guide as shown in Fig. 7-3-4 (A).
3. Turn the ACE tilt adjusting screw counterclockwise until the tape travels along the lower flange as shown in Fig. 7-3-4 (B).

c. Audio head azimuth adjustment

1. Play back the 7 kHz audio signal on the alignment tape in the SP mode.
2. Connect a millivoltmeter or oscilloscope to the audio line output terminal.
3. Turn the ACE azimuth adjusting screw to obtain maximum audio output.

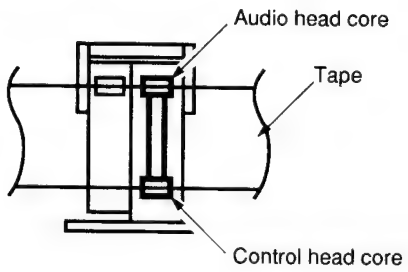


Fig. 7-3-3

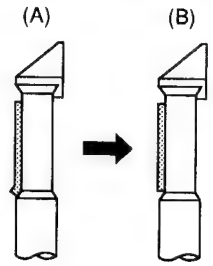


Fig. 7-3-4 No. 8 guide rough adjustment

d. ACE head position adjustment

1. Play back the 3 MHz video envelope signal in the alignment tape in the SP mode. Loosen the ACE head position securing screw.
2. Insert a slot-type screwdriver into the ACE head position adjusting slit on the ACE main base and adjust the ACE main base so that the video envelope reaches a peak level at the tracking center position when the channel (tracking) up/down buttons of VTR are pressed simultaneously.

2) Playback phase adjustment

1. Perform the adjustment according to the methods stated in the electrical adjustment (servo circuit).

3) Linearity adjustment

1. Play back the LP mode 3 MHz video signal on the alignment tape.

Note:

- For models SP mode only, use the 3 MHz (A ch) video siganl in the SP mode.

2. Trigger the scope with the switching pulse to issue the envelope signal output.
3. Make sure the video envelope waveform (in its maximum output) meets the specification shown in Fig. 7-3-5. Again make sure the same by playing back the SP mode 3 MHz video signal on the alignment tape. If not satisfied, adjust as follows:

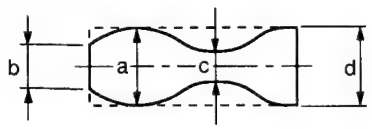
Note:

a = maximum output of the video RF envelope

b = minimum output of the video RF envelope at the entrance side

c = minimum output of the video RF envelope at the center point of cylinder

d = minimum output of the video RF envelop at the exit side of cylinder



c, b, d/a≧ 0.75 (S-VHS model)

b, d/a≧ 0.63
c/a≧ 0.75 } (Non S-VHS model)

Fig. 7-3-5

4. If the (A) section in Fig. 7-3-6 does not meet the specifications, adjust the S guide roller in up or down direction.
5. If the (B) section in Fig. 7-3-6 does not meet the specifications, adjust T guide roller in up or down direction.

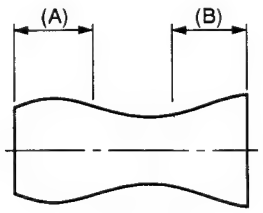


Fig. 7-3-6

6. After completion of the adjustment(s), push the channel (tracking) up/down button and make sure video envelope variations are almost flat.
   Next, play back the 3 MHz SP mode video signal on the alignment tape and makes the video RF envelope variations are also flat when channel (tracking) UP/DOWN buttons is pushed.
7. If the envelope varies like NG figures as shown in Fig. 7-3-7, perform the adjustment again.

   Smooth secondary curves are allowable level.

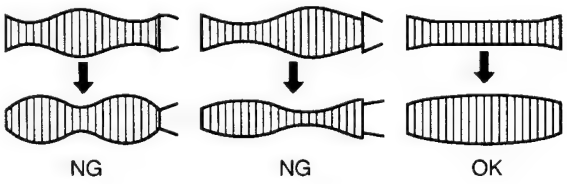


Fig. 7-3-7 Abnormal waveform variation

4) ACE head assembly fine adjustment

a. ACE head height fine adjustment

1. Play back the stereophonic alternative recording 300 – 500 Hz audio signal on the alignment tape.
2. Adjust the ACE height adjusting screw so that the signal envelope is obtained almost flat.

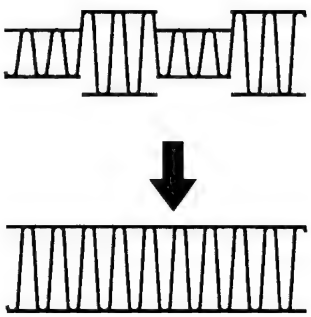


Fig. 7-3-8

Note:

- If there is no alignment tape (ST-C6, ST-C7), do not perform this item "a. ACE head height fine adjustment", and perform the process of the note in item "e. Audio head height check" described later.

b. ACE tilt adjustment

1. Observe the lower flange of No. 8 guide. If any wrinkle is observed, turn the ACE tilt adjusting screw counterclockwise until the wrinkle disappears.
2. If a gap is observed between the lower flange of No. 8 guide and the lower edge of tape, turn the ACE tilt adjusting screw clockwise until the tape travels along the lower flange.

Note:

- This adjustment is performed easily in SP mode playback, double speed playback mode or CUE mode.

c. Audio head height check

1. Play back the stereophonic alternative recorded 300 – 500 Hz audio signal as described in the step 4)-a, and check if the audio envelope is flat. If not, repeat the adjustment described in step 4)-a again.

d. Audio azimuth adjustment

1. Play back the 400 Hz, 7 kHz audio signal on the alignment tape.
2. Turn the ACE azimuth adjusting screw until the maximum audio output is obtained.

e. Audio head hight check

1. Play back the alignment tape desribed in step 4)-a and check if the audio envelope is flat. If not, repeat the adjustment described in step 4)-a.

Note:

- If there is no alignment tape (ST-C6, ST-C7), perform the audio height alignment using the current alignment tape at this adjustment step.

1. Playback the 400 Hz audio signal (SP mode) on the alignment tape.
2. Turn each three alignment screw of the ACE head to the same direction in 45 degrees steps evenly so that the audio output level becomes maximum.
3. Perform the confirmation and adjustment for the tilt and the azimuth again.

f. ACE head postion adjustment

1. Play back the 3 MHz video signal (LP mode) on the alignment tape.
2. Push the channel (tracking) up/down buttons simultaneously and reset the tracking at its center position.
3. Trigger the oscilloscope with the video switching pulse and observe the video envelope waveform.
4. Slide the ACE main base until the maximum envelope output is obtained as described in ACE head position coarse adjustment.
5. Play back the 3 MHz video signal (SP mode) on the alignment tape.
6. Make sure the envelope output is maximum when the tracking control is placed at its center position.

   If no envelope output is obtained with the tracking control set to the center position, again adjust it for maximum envelope output in SP and LP modes. When envelope output is maximum in the LP mode at the tracking center, difference with the case in the SP mode is within 3 ms.
7. Tighten the ACE head position fixing screw and secure the ACE main base.

g. After completion of ACE head fine adjustment, apply screw lock to two screws (tilt, azimuth adjusting screws) in front of the ACE head.

5) No. 9 guide lever adjustment

1. Set the VTR to Cue mode with E-240 tape (at beginning portion) loaded. Switch the Cue mode to the review mode when the tape has been rewound into the T-reel table to some extent.
2. Check tape wrinkle at the upper and lower flange of No. 8 guide. Check the tape does not come off from the flange while running. If the tape comes off from the flange, replace the pinch lever, capstan motor or No. 9 guide lever since the part(s) is (are) defective.

Note:

- Modify the lid of the cassette for the alignment tape E-240 previsously so that the alignment is performed easily.

6) Check for transitional operation from Review to Play, slot-in to play

1. Play back the LP mode white video signal on the alignment tape in Review mode and observe the video envelope with the oscilloscope.
2. Switch the Review mode to the Play mode. When switched to the Play mode, make sure the entrance side envelope comes to an approximate steady state within 3s as shown in Fig. 7-3-9.

If it does not rise within 3s, take the following steps starting 4).

3. Switch the cassette slot-in mode to the Play mode. As in item 2), if it does not rise within 3s, adjust as follows.

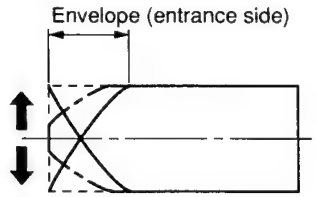


Fig. 7-3-9 Video envelope rising when operation mode is switched from review to play mode

4. Adjust the S guide roller and perform the linearity adjustment again.
5. Check above items 2) and 3) to see that the video envelope rises within 3s. If not, S slider assembly or the tension lever is damaged. Replace either (or both) of them.

Note:

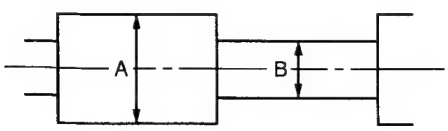
- If the rising characteristic is poor in Review mode, screen noise may occur in synchronous editing recording. Perform the adjustment carefully.

7) Envelope check

1. Make recordings and play back the tapes (E-180 and E-240) in SP and LP modes and make sure the playback output envelope meets the specifications shown in Fig. 7-3-5.
2. In playback the tape (with a E-180), the video envelope should meet the specification as shown in Fig. 7-3-10.

Note:

- Check for both modes, SP and LP. Also check for AFM envelope when using a Hi-Fi model.



- B/A ≧ 0.55
- B ≧ 120mV

Fig. 7-3-10 Envelope output and output difference

3. If the performance does not meet both specifications above 1 and 2 above, replace the upper cylinder assembly.
4. Set the VTR to Rec mode (LP) with the E-180 tape loaded (at the beginning part) and check operation of the synchronous editing recording.
5. If picture noises are observed at the starting position of the editing, perform "6) Check for transitional operation from Review to Play, slot-in to play".

8) Tape wrinkle check

1. Playback the E-240 tape in the normal Play mode, CUE mode, Review mode and the frame advance mode, and check each guide for wrinkle.
2. If excessive tape wrinkle is observed at the mode shown below, perform the associated adjustments also shown below. (The parts described in ( ) may need to replace.)

a. Playback mode

Tape wrinkle at the S, T-guide rollers section

Item 3) Linearity adjustment (Slider assembly)

Tape wrinkle at No. 8 guide flange

Item 1) ACE head assembly coarse adjustment (Pinch roller)

Tape wrinkle at lower flange of No. 1 guide

Item 6) Check for transitional operations from Review to Play, and Slot-In to Play (Tension lever)

b. Review mode

Tape wrinkle at No. 8 guide

Item 1) ACE head assembly coarse adjustment (Pinch lever, No. 9 guide lever, capstan motor)

Tape wrinkle at the guide rollers

Guide roller adjustment (Slider assembly)

c. Frame advance mode

Tape wrinkle at No. 8 guide

Item 3) Linearity adjustment (Pinch lever, capstan motor)

9) Maximum AFM envelope output point check (Hi-Fi model)

1. Playback the SP mode 3 MHz video signal and the 400 Hz AFM signal on the alignment tape.
2. Trigger the oscilloscope with the video switching pulse, adjust the tracking control and check the control pulse phase at the maximum video envelope (A ch) output point.
3. Make sure the control pulse phase difference among each maximum point of AFM envelope, Ach and Bch is within ± 3 ms with the above point used as the basic reference.

Note:

- If the phase difference exceeds 3 ms, replace the upper cylinder.

2. ELECTRICAL ADJUSTMENT

<Test equipment required>

Adjustment will be performed with the following test equipment.

1. Color TV (Monitor)
2. Oscilloscope, 2 CHs, 15 MHz or higher with delay system
3. Frequency counter (7 digits or higher)
4. Millivoltmeter
5. Digital voltmenter
6. Tester (20 kΩ/V)
7. Audio generator
8. Audio attenuator
9. Alignment tapes
   Part code: ST-C6: 70909409, ST-C7: 70909410
10. Alignment screw driver (jig)
11. Color pattern generator
12. Video sweep generator

<Color bar signal>

Color bar signals of 75% recorded on the alignment tapes are shown in Fig. 2-1-1.

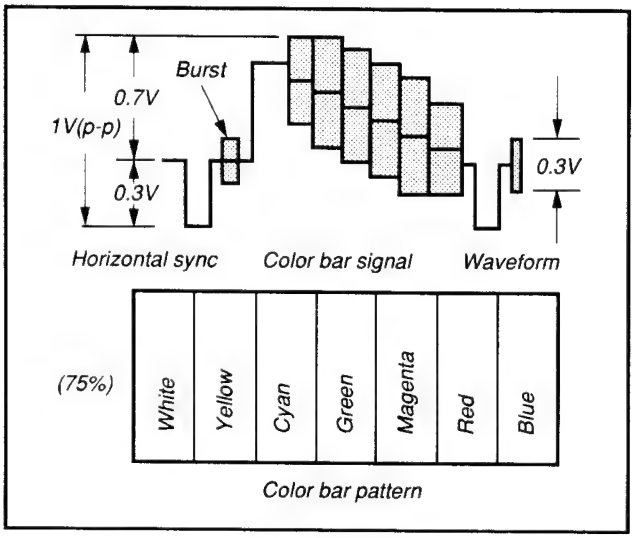


Fig. 2-1-1

<Specified input and output levels, and impedance>

Video input:	Negative sync, standard composite video siganl 1 V(p-p), 75Ω
Video output:	Same as the video input 1 V(p-p), 75Ω
Audio input:	308 mV(rms), more than 47 kΩ (phono type), more than 10 kΩ (21 pin type)
Audio output:	308 mV(rms), less than 1.0 kΩ (21 pin type)

<Alignment sequence>

Recorded the alignments in the sequence as shown in Fig. 2-1-2.

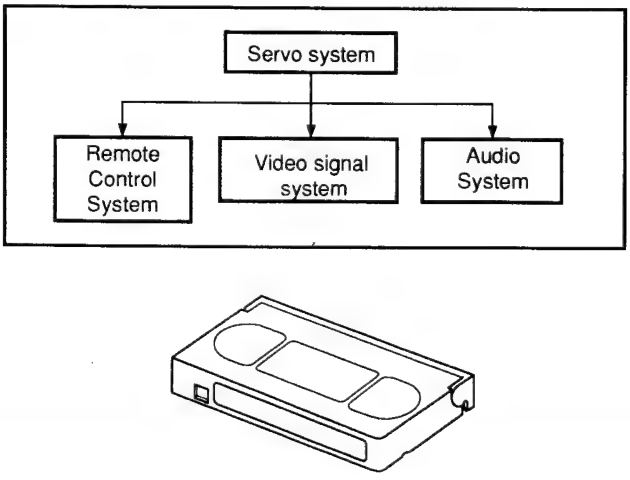


Fig. 2-1-2

Alignment tape specifications

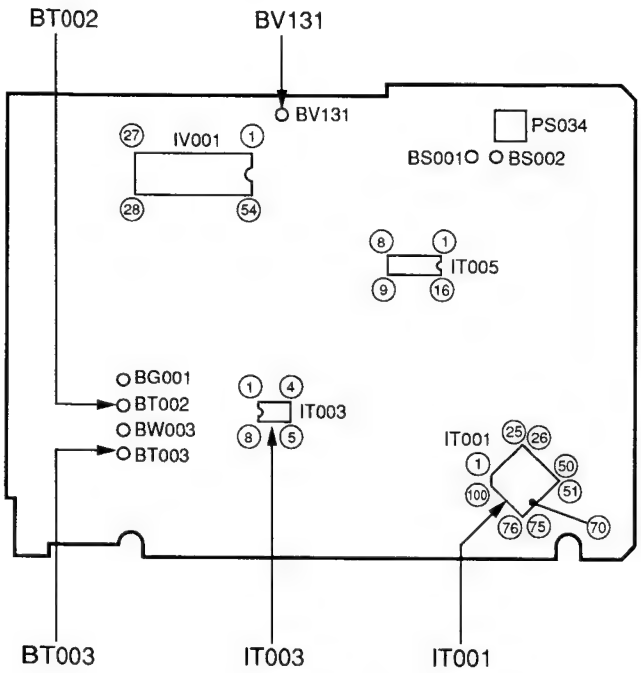
[1] ST-C6

Segment	System	Playback		Video Signal	Audio Signal	Applications
		Time (min)	Mode			
1	PAL & SECAM	10	SP	Mono Scope	1 kHz	Playback phase check, audio level check
2	PAL & SECAM	5	SP	3 MHz A ch	400 Hz and 7 kHz	ACE head position adjustment, ACE head azimuth adjustment, Linearity adjustment
3	PAL & SECAM	5	SP	3 MHz A ch	1 kHz (stereo)	ACE head position adjustment, ACE head height adjustment, Linearity adjustment
4	PAL	5	SP	Color bar	3 kHz	Video and Sound checks
5	SECAM	5	SP	Color bar	3 kHz	Video and Sound checks
6	MESECAM	5	SP	Color bar	3 kHz	Video and Sound checks
7	NTSC	5	SP	Color bar	1 kHz	Video and Sound checks

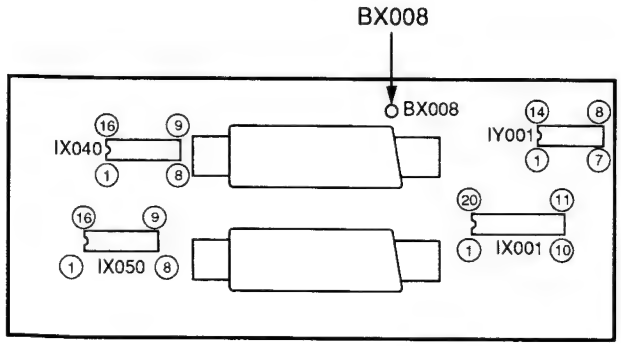
[2] ST-C7

Segment	System	Playback		Video Signal	Audio Signal	Applications
		Time (min)	Mode			
1	PAL	5	LP	3 MHz A ch	500 Hz (stereo)	ACE head position adjustment, ACE head height adjustment, Linearity adjustment
2	PAL	3	LP	Color bar	3.2 kHz	LP mode operation check, ACE head azimuth check and adjustment
3	PAL	3	SP	Color bar	AFM 400 Hz	SP mode operation check, AFM check
4	PAL & SECAM	5	SP	3 MHz A ch	AFM 400 Hz	AFM tracking checks
5	SECAM	5	LP	3 MHz A ch	No signal	Linearity adjustment
6	SECAM	3	LP	Color bar	No signal	LP mode operation check
7	SECAM	3	SP	Color bar	AFM 400 Hz	SP mode operation check, AFM check

2-1. Servo Circuit



Main PC Board



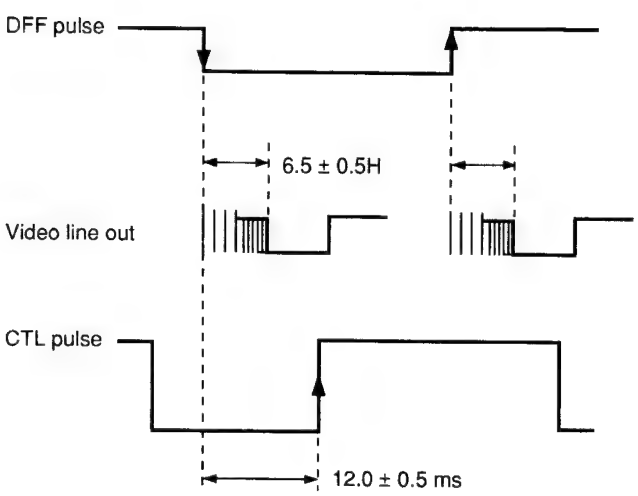
Terminal PC Board

2-1-1. Playback Phase (PG) Adjustment

Test point: BT002, BT003, BX008 (Video out)

Test equipment: Oscilloscope

1. Confirm that phase difference between the fall of the DFF pulse (BT002) and the rise of CTL pulse (BT003) is 12.0 ± 0.5 ms.
2. Further, observe the envelope (BV131) waveform, and confirm that the ACE head position adjustment and linearity adjustment have been made, and C-SYNC (pin 70 of IT001) is being input during playback.
3. Set the VTR to the STOP mode.

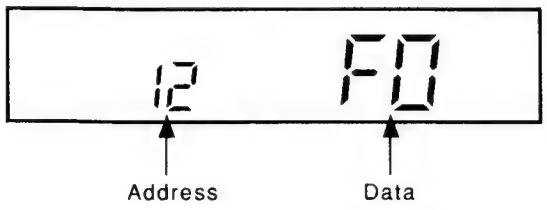


4. Press the unit's channel up/down buttons simultaneouly for more than 5s.
5. Afterwards, within 2s, press the PLAY button on the remote controller.
6. The automatic adjustment will be made for about 10s, all the displays will blink. If the automatic adjustment is not carried out, confirm that the alignment tape has a safety tab or not, and redo from the step 3.
   1) When adjustment has been completed:
      The display will blink for 10s, stop blinking and return to the normal display in the STILL mode, then it shifts to the playback display in the play-back mode.
   2) When adjustment fails:
      It goes into the STOP mode.
7. Confirm that the play indicator is displayed, and confirm that the rising and falling edge of the SW pulse is 6.5 ± 0.5H from the V-sync front edge of the video signal.

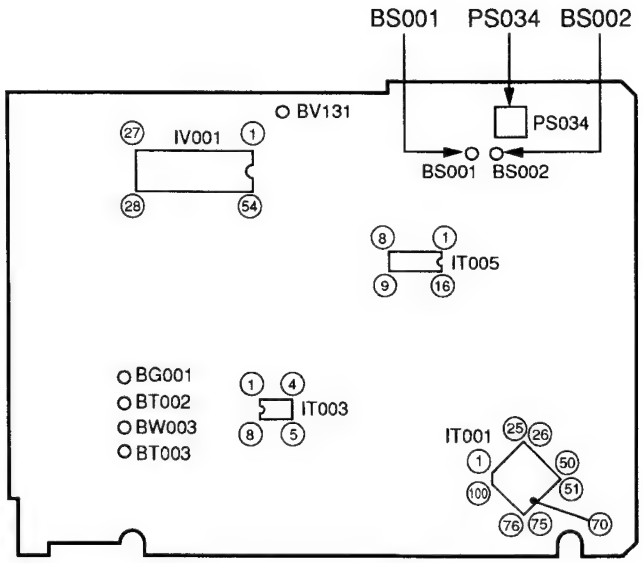
2-1-2. In Case of IT003 is Replaced

When IT003 is replaced, the data in the VTR is required to memorize in the new one. So perform the following procedures.

1. Press the channel up/down buttons on the VTR simultaneously for more than 5s while the display blinks and the unit is in the power off mode.
2. And then within 2s, press the CANCEL button on the remote controller.
3. After displaying the address at the channel display area and the data at the minute display area, set the address to 12 using the channel up/down buttons on the remote controller.
   Next, set the data to F0 using the FF/REW buttons on the remote controller. The data goes up using FF button and down using REW button.
4 Perform the adjustement described in the item "2-1-1. Playback Phase (PG) Adjustment".
5. Pull out the power cord plug from the AC outlet once and insert the power cord plug into the AC outlet again.



2-2. Audio Circuit



Main PC Board

2-2-1. Bias Level Adjustment

Test Point: BS001, BS002

Test equipment: Millivoltmeter

Adjusting point: PS034

1. Set the VTR to record mode.
2. Connect BS001 to the millivoltmeter and BS002 to GND.
3. Adjust PS034 to obtain 3.6 ± 0.1 mV(rms).

2-3. Self Diagnosis Function

2-3-1. Outline

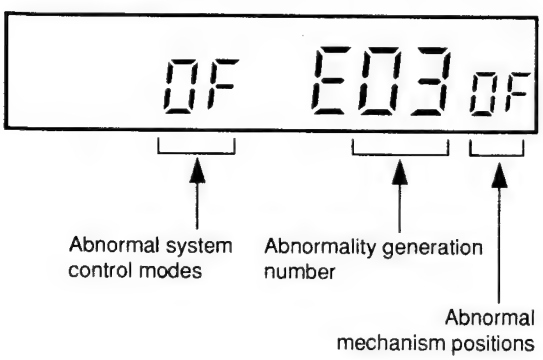
When a tape running stops or the VTR enters the power OFF mode, etc. due to some abnormality, the abnormality is stored in the EEPROM and displayed on the display tube.

2-3-2. Storing abnormal modes

- The abnormality is classed into 5 groups, and the abnormality number, system control mode, and the mechanism position at which the abnormality occurred are stored in the EEPROM.
- The writing timing is just after the abnormality occurred.

2-3-3. Abnormality mode display

- Press the CH UP and CH DOWN buttons on the VTR simultaneously for more than 5s.
- And then within 2s, press the STILL button on the remote control.
- The system control mode at which the abnormality occurred is displayed at the channel display area, "E" is displayed at the hour digit, abnormality generation number is displayed at the minute digit, and the mechanism position is displayed in the second digit position.
- The abnormality mode is displayed regardless of the power on off.



- When the Counter Reset button is pressed in the display period, the abnormality display data is initialized and "-" is displayed.

The data displayed are as follows:

Abnormality generation number

01	Cylinder stop
02	Reel abnormality (take up)
03	Reel abnormality (supply)
04	Abnormal slot in/ slot out
05	Abnormal loading

Abnormal system control modes

00	Standby
01	Stop
02	Rewind
03	Review
04	FF
05	Cue
06	Playback
07	Still, slow playback
08	2X speed
09	Unloading Stop
0A	Reverse playback
0b	Still in reverse playback, Reverse slow playback
0C	Recording
0d	Record pause
0E	Power off eject
0F	Eject
10	Short FF
11	Short REW
13	Audio dubbing
14	Audio dubbing pause

Abnormal mechanism positions

01	F/L out
03	F/L down
05	Loading/unloading
07	Reverse rotation with pinch roller ON
09	Playback with pinch roller ON
0b	Stop with main brake ON
0d	FF/REW
0F	Position detection impossible

Positions 0, 2, 4 exist as mechanism positions. For example, 8 shows a position between 7 and 9 (between playback position and review position).

SECTION 3
SERVICING DIAGRAMS

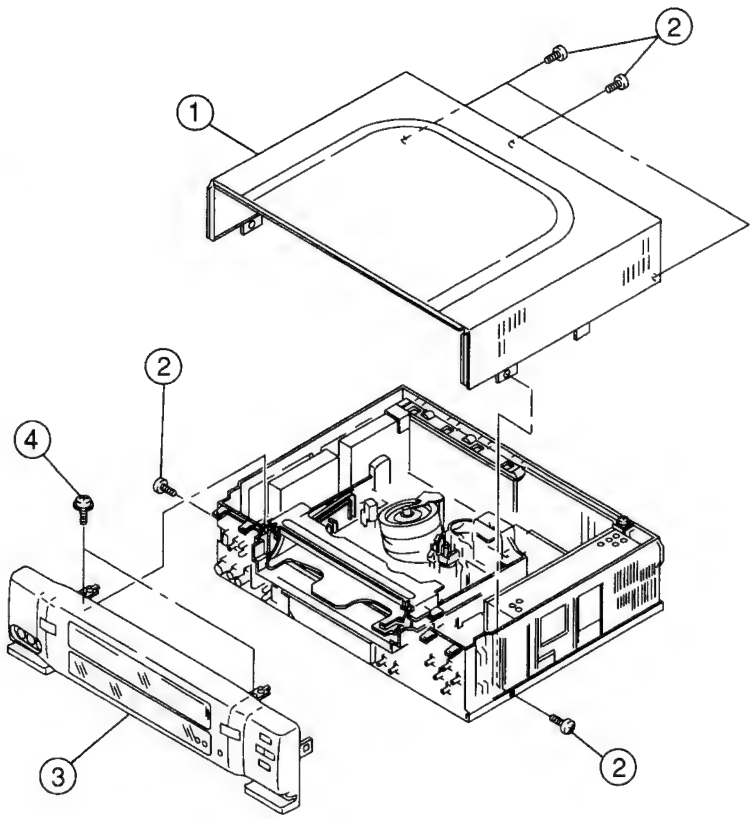
1. INSPECTION PROCEDURE

Operation steps		Items to be confirmed	Inspection block	Page	
				Block Diagram	Circuit Diagram
1. AC Plug-in	Time setting Program timer setting	Clock display Time setting operation	Power (AC system) KDB	3-11 3-15	3-29 3-34
2. Power SW ON	Timer/counter, Memory Channel selection, EE picture & tone quality	Mode display lamp TV receive condition, Channel select operation, EE picture quality, Tone signal level	Power Logic RF reception Audio (EE, REC mode)	3-11 3-17 3-12 3-26	3-29 3-36 3-31 3-48
3. Cassette-in and Cassette-out	Cassette-in Cassette loading Eject Casette-out	F/L mechanism operation Cassette loading operation Eject operation Indicator lamp Abnormal sound	Logic	3-17	3-36
4. Key Entry Operation Remote Control	REC, PLAY Cue/Review Still, Frame advance/slow FF/REW	Indicator lamp Each mode operation (Tape drive operation) Abnormal sound	Logic	3-17	3-36
5. Special Functions Counter Functions Tracking	Linear time counter, Remaining time display, Index/skip search, Time search Digital auto tracking	Each mode operation Mode operation	Servo/Logic Servo/Logic	3-17 3-17	3-36 3-36
6. Playback Function Picture Sharpness Tone Quality Othres	PLAY (Test tape: ST-C6, ST-C7) Cue/Review Still/Slow	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-23 3-26 3-17	3-41 3-48 3-36
7. REC/PLAY Functions Picture Sharpness Tone Quality Others	REC/PLAY	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-23 3-26 3-17	3-41 3-48 3-36

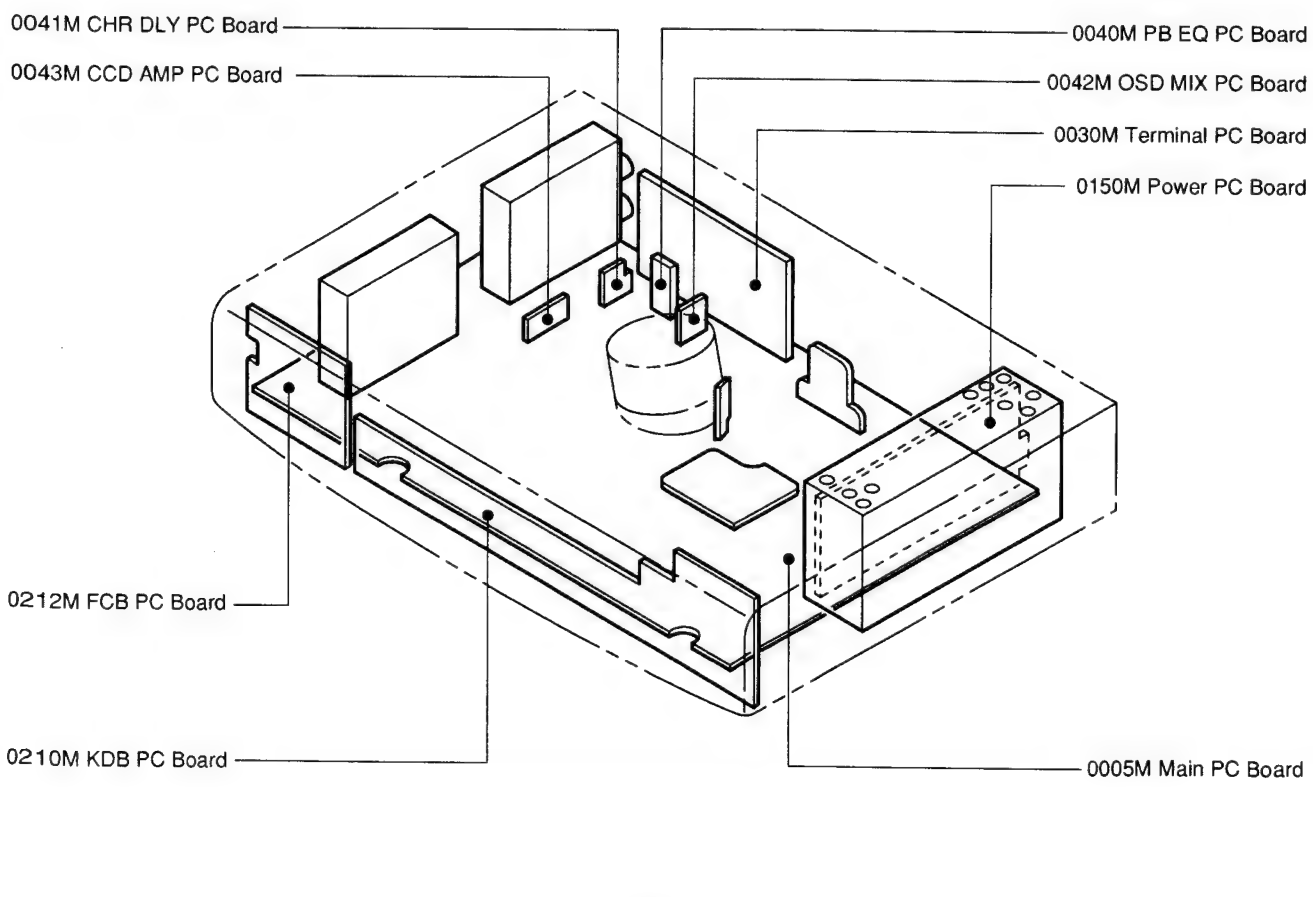
How to use the table
1. When inspecting a defective VTR, proceed according to the steps shown in the table.
2. Check the items to be confirmed for each operation step.
3. If a problem is found on the item, check waveforms (level) referring to the block diagram relating to the items.
4. Use PC board pattern diagram and schematic diagram to examine the circuit precisely.

2. REMOVAL OF CABINET

1. Disconnect power cord plug from AC outlet.
2. Remove 5 screws ② securing top cover ①.
3. Remove the top cover ① by sliding it backward.
4. Remove 2 screws ④.
5. Remove the front panel ③.



3. ELECTRICAL UNITS LOCATION DIAGRAM



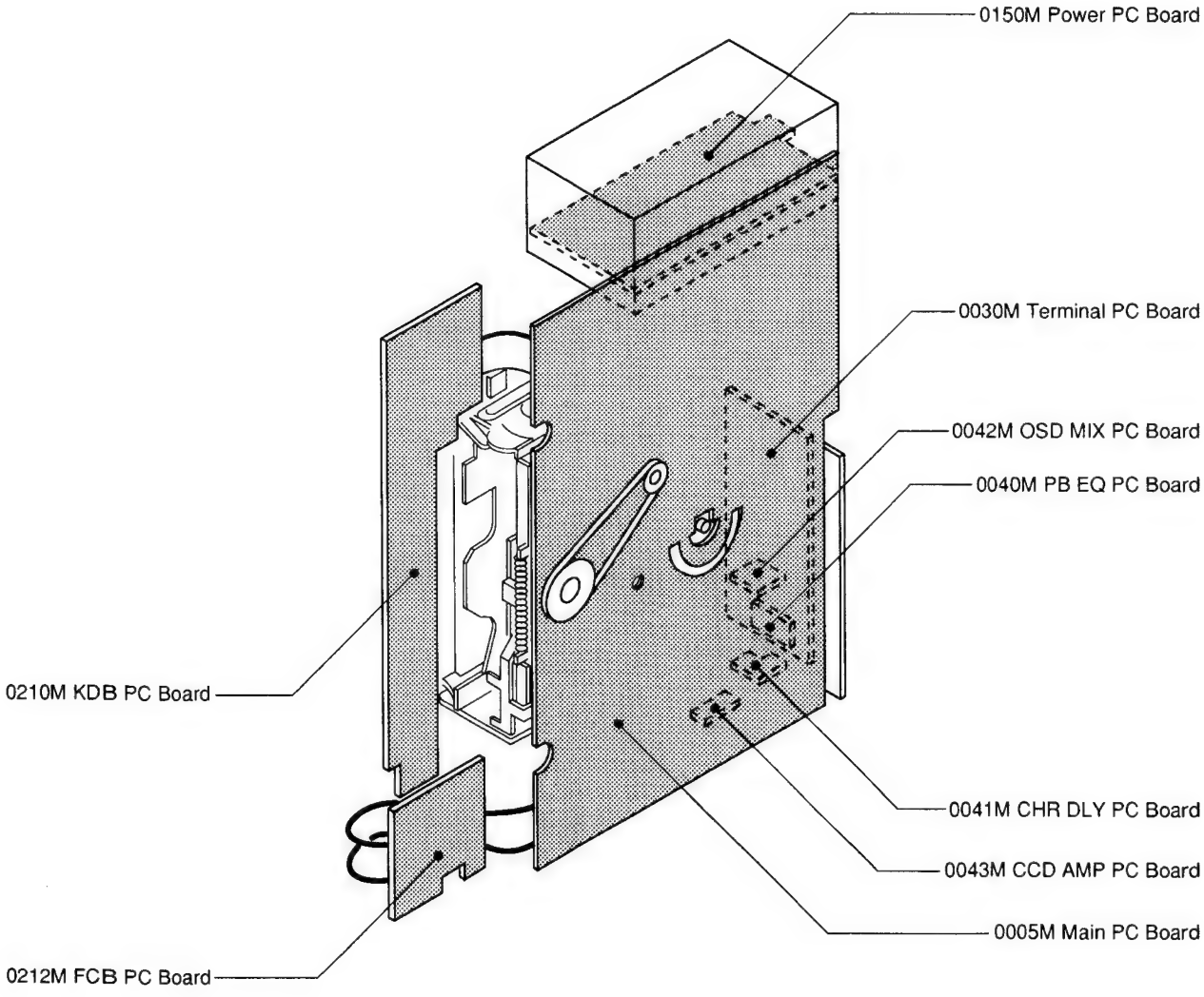
4. STANDING PC BOARDS FOR SERVICING

After removing the mechanical deck with the main PC board, place the mechanical deck to upright. Then perform servicing in the condition that all the units are connected each other.

Note:

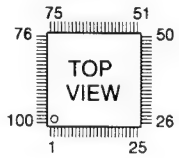
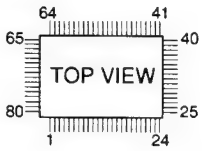
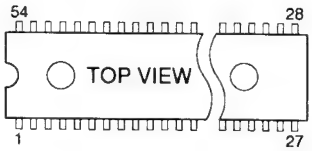
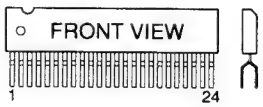
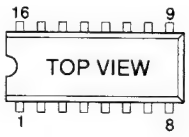
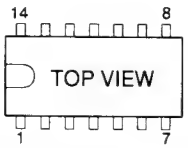
Applying an excessive force to the connector connecting KDB and FCB PC board will damage the connector.

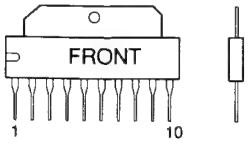
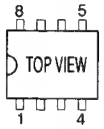
So, take much care when removing them.



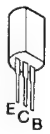
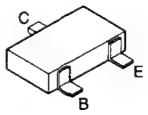
5. PART CONFIGURATION AND THEIR SYMBOLS

1.ICs

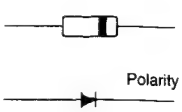
NAME	SHAPE
TMP90PR74DF	
TMP87CK70AF-6204	
TA8892N	
TL8844P	
STV6400	
BA7795LS	
MC14053BCP TB6515AP TL8843P	
MC14052/BCP	
U4614B	

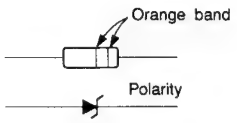
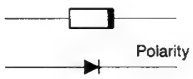
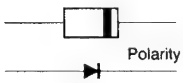
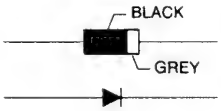
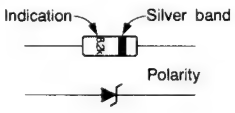
NAME	SHAPE
TA7291S	
LM393N ST24C04	
PST7032MT	

2.TRANSISTORs

2SA1020-Y 2SC2236-Y(C)	
BC337 BC548B	
BC848B,RN1401 BC847B,RN1402 BC857B,RN1404 BC848,RN1405 DTC144E,RN2403 RN2402,BC858	

3.DIODEs

1N4007 1N4148 1N4148	

NAME	SHAPE	NAME	SHAPE
ZPD5.6			
BA158 MUR115			
1N4001			
BAV20			
BA157 1N5822 FUF5404			
LL4148 LL4448			
ZMM5.1 ZMM5.6 ZMM4.7			
BA157 ZPD12			

5-1. Replacing Subminiature "CHIP" Parts

5-1-1. Required Tools:

1. Fine tipped, well insulated soldering "pencil", about 30 Watts.
2. Tweezers.
3. Blower type hair dryer.

5-1-2. Soldering Cautions:

1. Do not apply heat for more than 3s.
2. Avoid using a rubbing stroke when soldering.
3. Discard removed chips; do no reuse them.
4. Supplementary cementing is not required.
5. Use care not to scratch or otherwise damage the chips.

5-1-3. Removal (Resistors, Capacitors, etc.):

1. Melt the solder at one side.

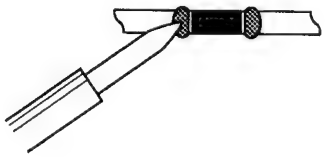


Fig. 1

2. Grasp the part with tweezers and melt the solder at the other side.

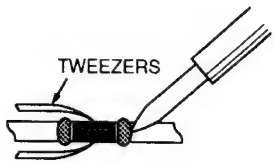


Fig. 2

3. Remove the part with a twisting motion.

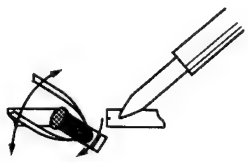


Fig. 3

5-1-4. Removal (Transistors, Diodes, etc.):

1. Melt the solder of one lead.

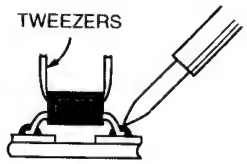


Fig. 4

2. Lift the side of that lead upward.

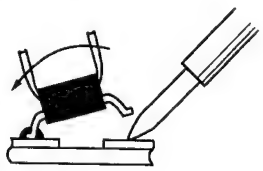


Fig. 5

3. Simultaneously heat solder the two remaining leads and lift part to remove.

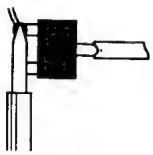


Fig. 6

5-1-5. Preheating (Except for semiconductors):

Immediately before installing new resistors or capacitors, use a blower type hair dryer and preheat the part for about two min. at approximately 150°C.

5-1-6. Replacement:

1. Presolder the contact points of the circuit pattern.

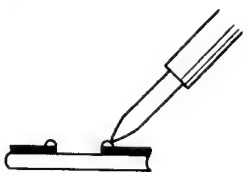


Fig. 7

2. Press the part downward with tweezers and apply the soldering pencil as indicated in the figure.

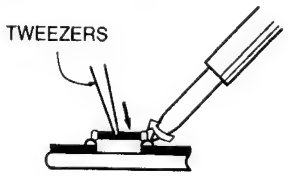


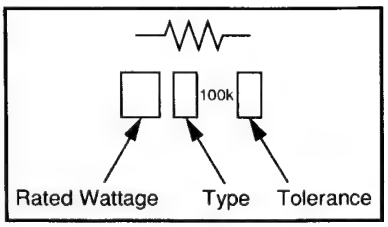
Fig. 8

5-2. Precautions for Part Replacement

- In the schematic diagram, parts marked ⚠ (ex. ⚠ F801) are critical part to meet the safety regulations, so always use the parts bearing specified part codes (SN) when replacing them.
- Using the parts other than those specified shall violate the regulations, and may cause troubles such as operation failures, fire etc.

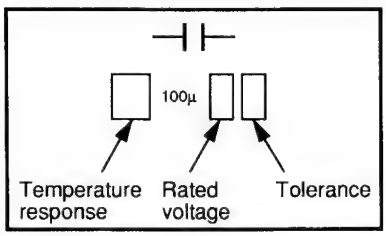
5-3. Solid Resistor Indication

Unit	None ..... Ω k ..... kΩ M ..... MΩ
Tolerance	None ..... ±5% B ..... ±0.1% C ..... ±0.25% D ..... ±0.5% E ..... ±1% G ..... ±2% K ..... ±10% M ..... ±20%
Rated Wattage	(1) Chip Parts None ..... 1/16W (2) Other Parts None ..... 1/6W Other than above, described in the Circuit Diagram.
Type	None ..... Carbon film S ..... Solid R ..... Oxide metal film W ..... Metal film W ..... Cement FR ..... Fusible



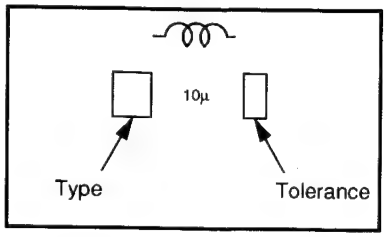
5-4. Capacitance Indication

Symbol	⊣⊢ ..... Electrolytic, Special electrolytic ⊣⊢ ..... Non polarity electrolytic ⊣⊢ ..... Ceramic, plastic ⊣⊢ ..... Film ⊣⊢ ..... Trimmer
Unit	None ..... F μ ..... μF p ..... pF
Rated voltage	None ..... 50V For other than 50V and electrolytic capacitors, described in the Circuit Diagram.
Tolerance	(1) Ceramic, plastic, and film capacitors of which capacitance are more than 10 pF. None ..... ±5% or more B ..... ±0.1% C ..... ±0.25% D ..... ±0.5% F ..... ±1% G ..... ±2% (2) Ceramic, plastic, and film capacitors of which capacitance are 10 pF or less. None ..... more than ±5% pF B ..... ±0.1 pF C ..... ±0.25 pF (3) Electrolytic, Trimmer Tolerance is not described.
Temperature characteristic (Ceramic capacitor)	None ..... SL For others, temperature characteristics are described. (For capacitors of 0.01 μF and no indications are described as F.)



5-5. Inductor Indication

Unit	None ..... H μ ..... μH m ..... mH
Tolerance	None ..... ±5% B ..... ±0.1% C ..... ±0.25% D ..... ±0.5% F ..... ±1% G ..... ±2% K ..... ±10% M ..... ±20%
Type	PL ..... Peaking For other, model name is described.



5-6. Waveform and Voltage Measurement

- Measurement of waveform and voltage at each section in the color circuits was conducted with sufficient service color bar signal being received and reproduced in normal conditions.
- Waveforms and voltage values for the remaining circuit were measured with a broadcasting signal normally received, so they may vary slightly according to the programs being received. Use them as a measure for servicing.
- All voltage values except the waveforms are expressed in DC and measured by a digital voltmeter.

5-7. Chip Part Replacement

(Use spare part with wire leads connected.)

1. Hold a Chip part to be removed with tweezers and apply heat to the solder at one end of the part with a soldering iron. (Fig. 9)

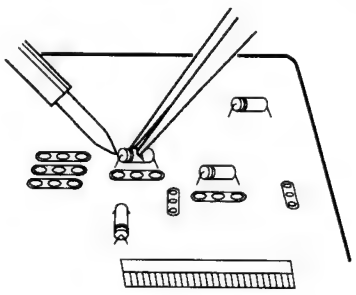


Fig. 9

2. Apply heat to the solder at the other end of the part and remove it.

   The heating time should be as short as possible so the excessive heat is not applied to foil patterns and the PC Board.

3. If it is difficult to remove the part, temporarily stop the desoldering job and wait until temperature of the part lowers.

   Then, repeat steps 1 and 2.

4. Form leads of the replacement part (general part equivalent to the chip part) as shown in the figures and solder place. (Fig. 10)

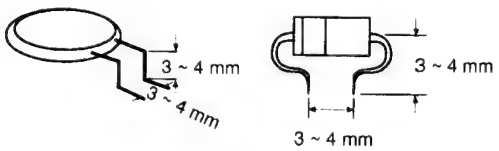


Fig. 10

5. Mount the replacement part so that it does not touch any other parts. (Fig. 11)

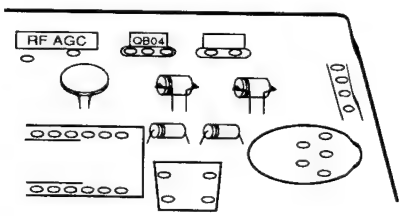
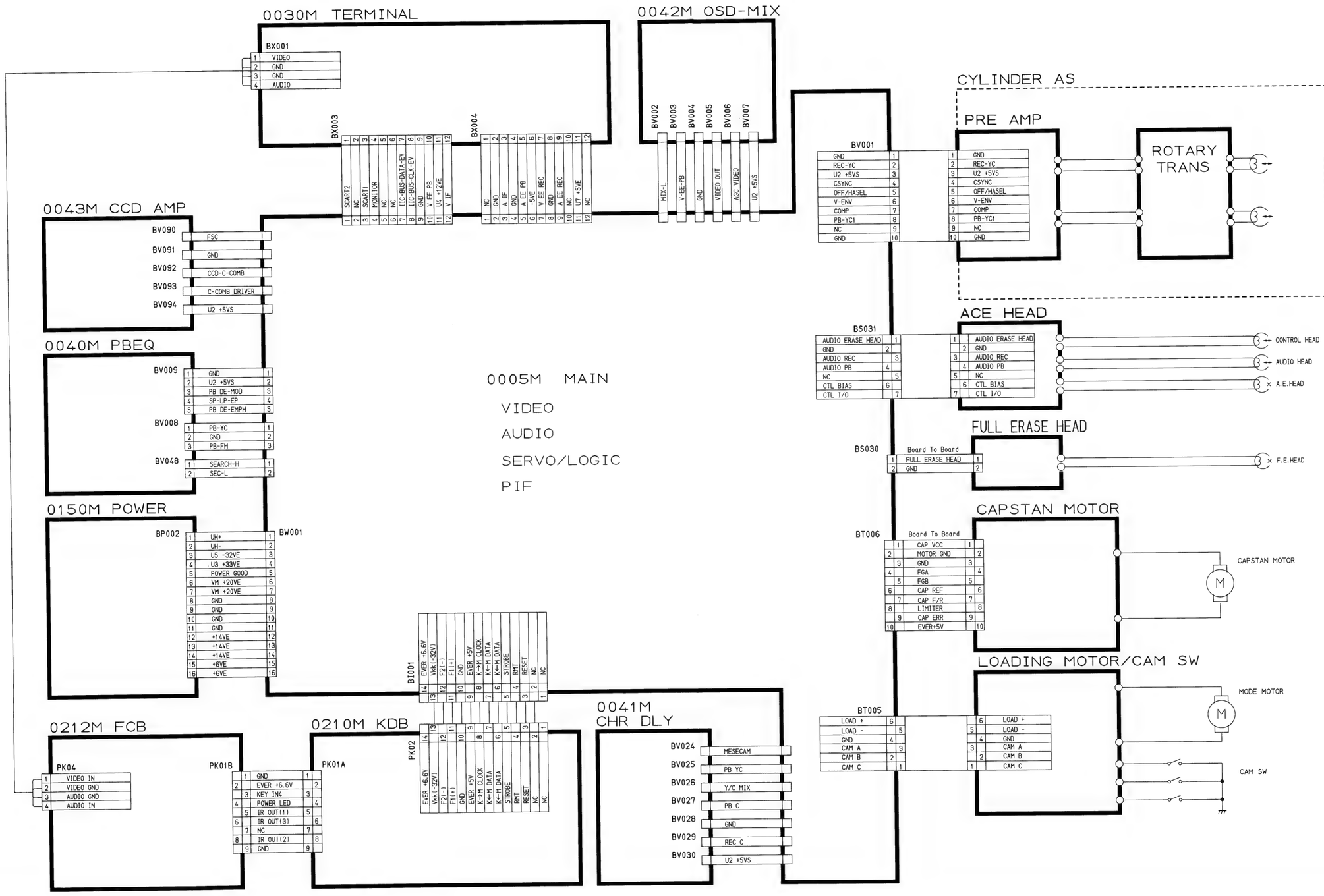


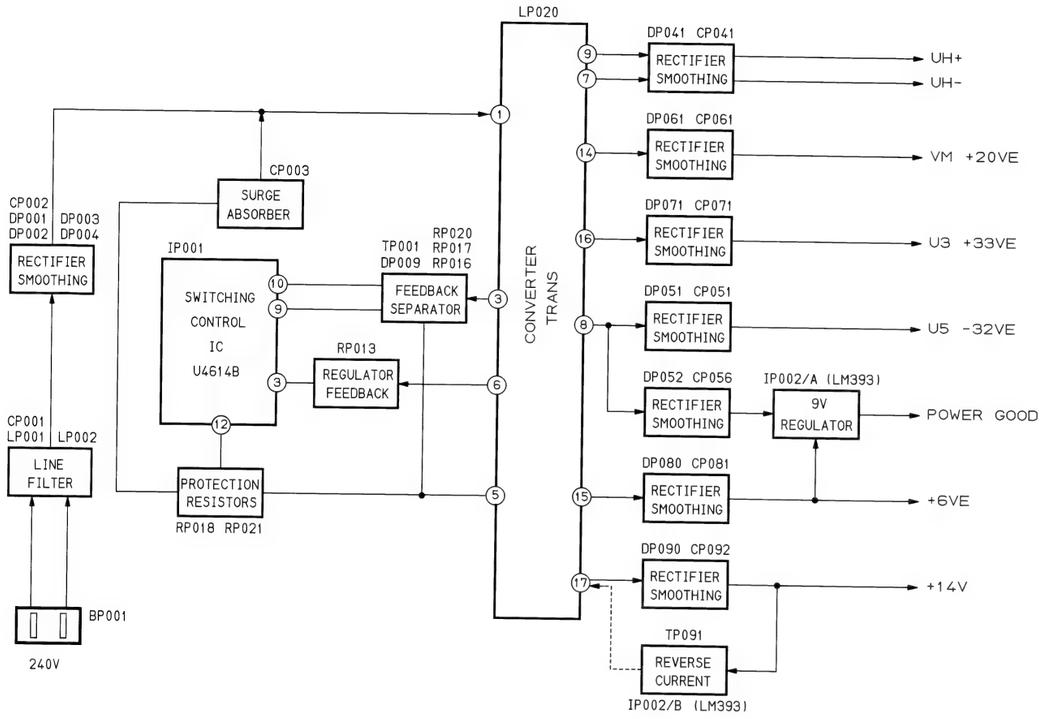
Fig. 11

6. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

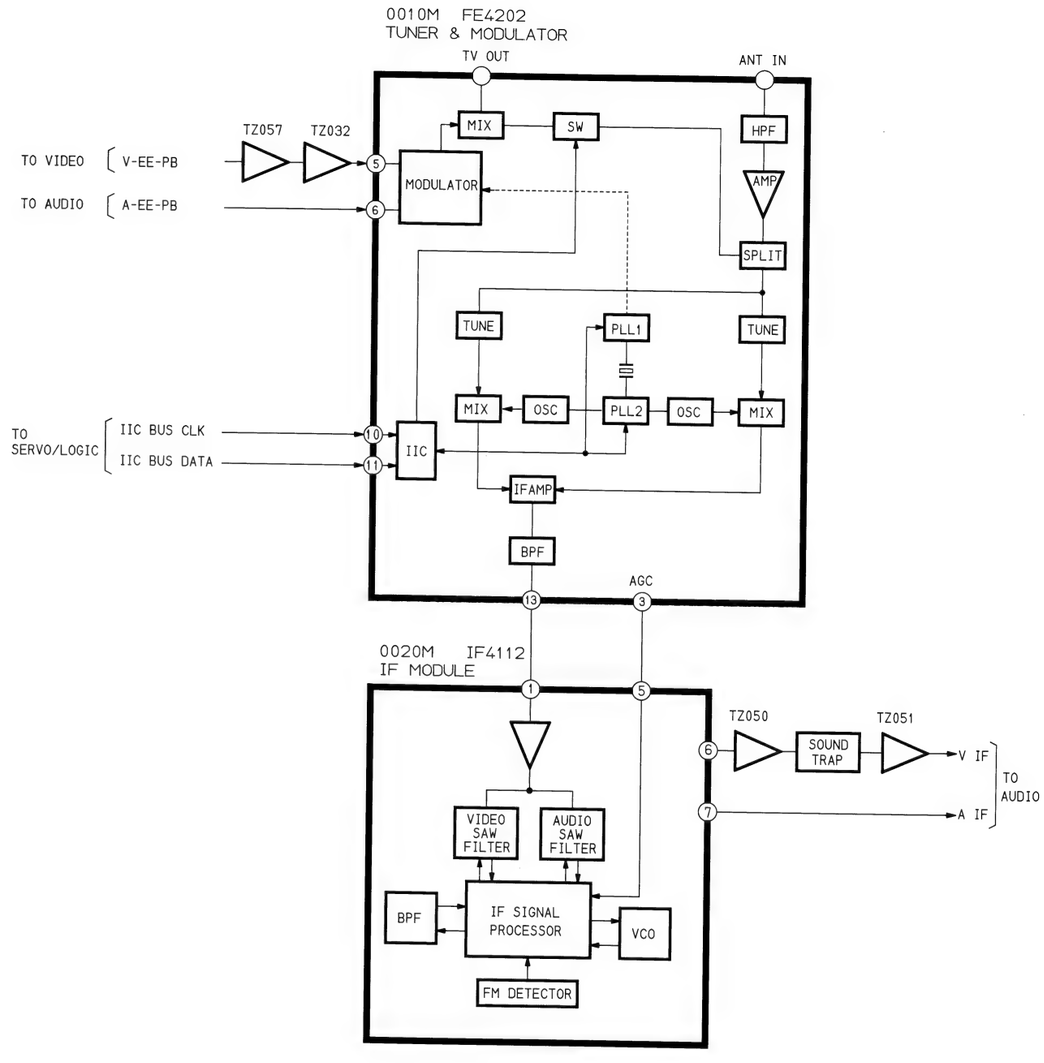


7. BLOCK DIAGRAMS

7-1. Power Block Diagram

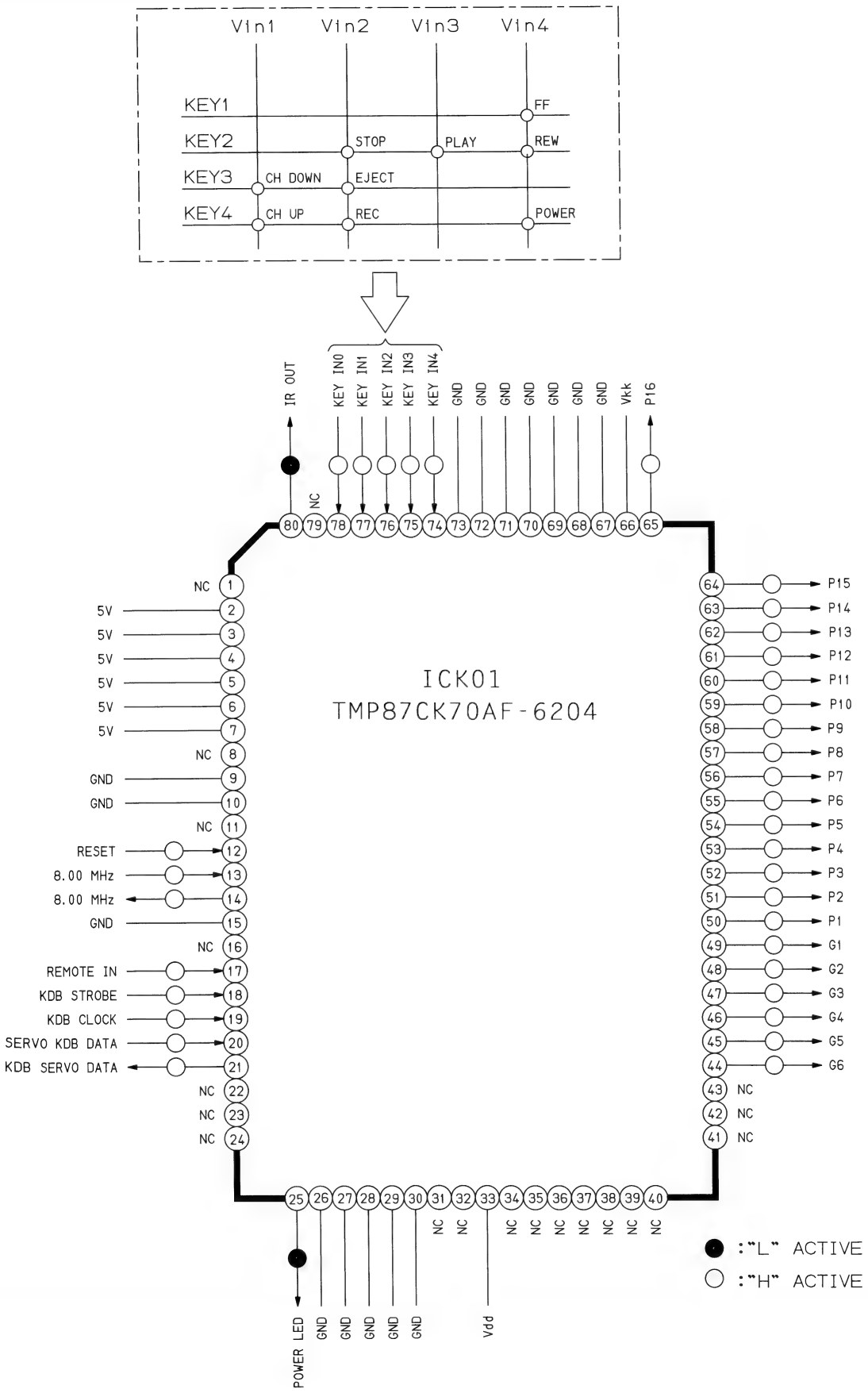


7-2. PIF Block Diagram



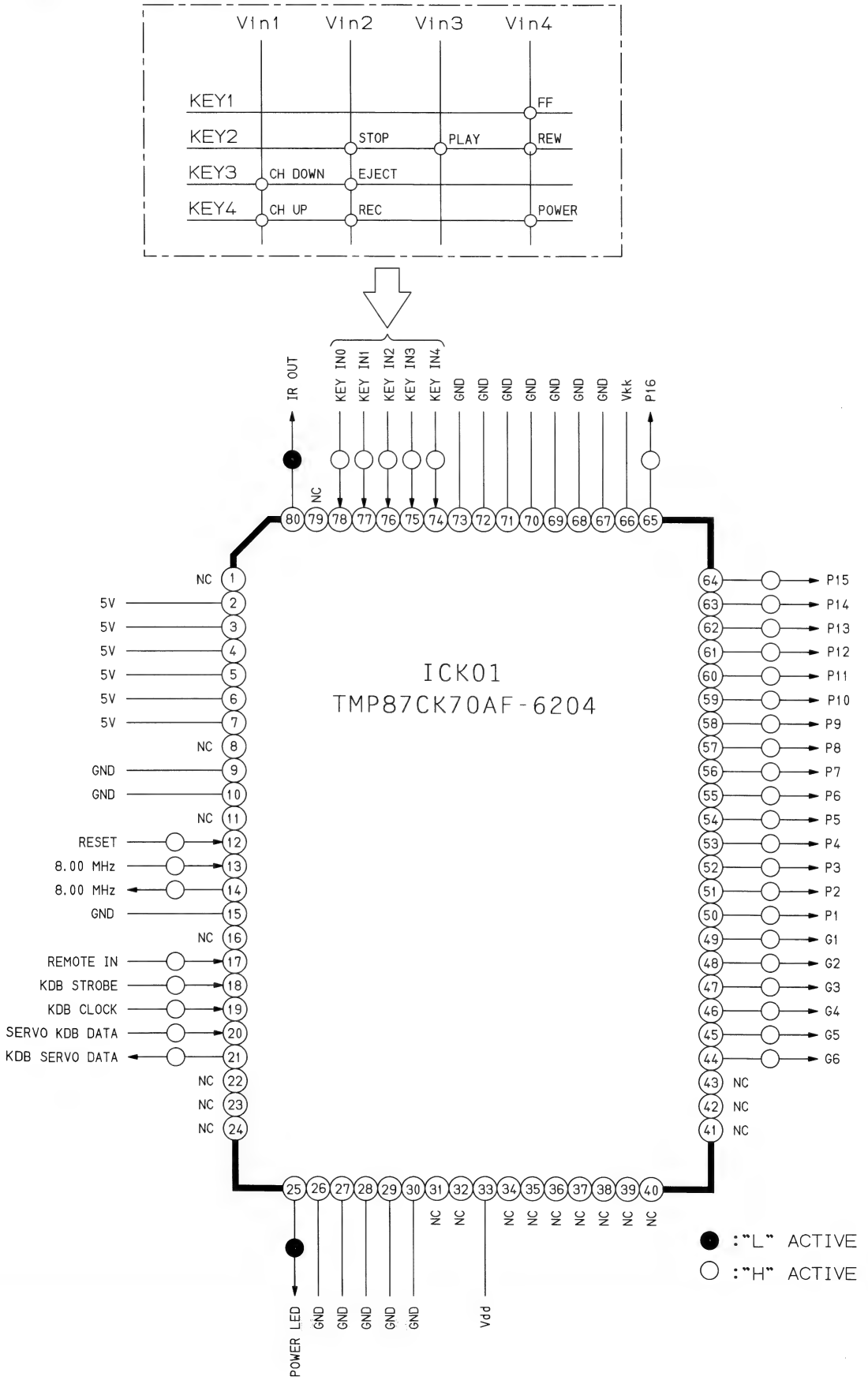
7-3. KDB Block Diagram

7-3-1. Timer Microcomputer Terminal Function

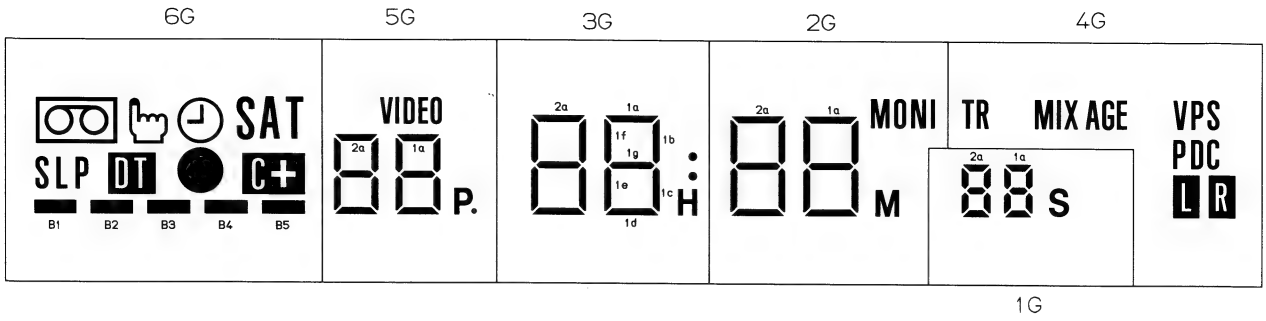


7-3. KDB Block Diagram

7-3-1. Timer Microcomputer Terminal Function



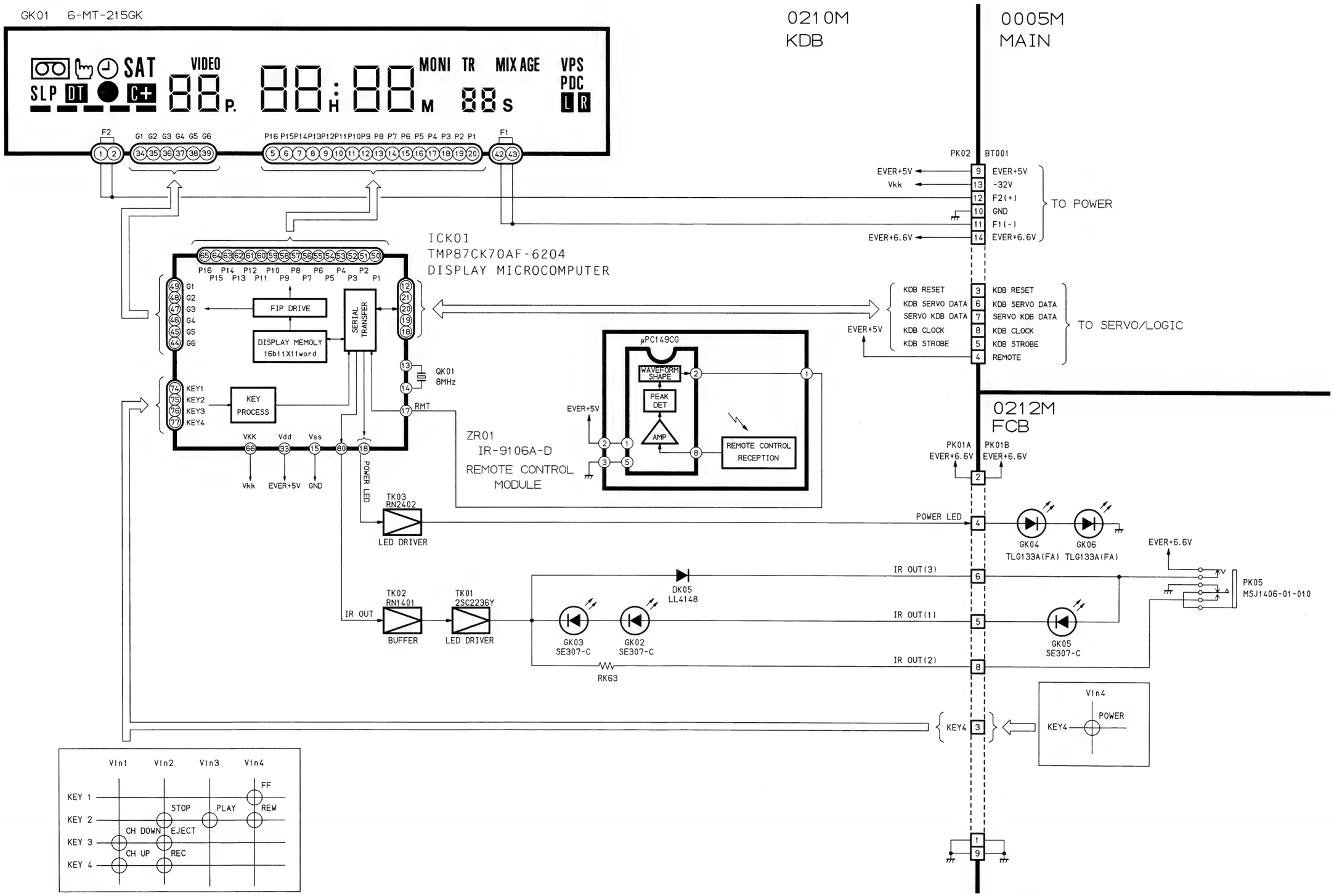
7-3-2. Key Display GX01 6-MT-215GK



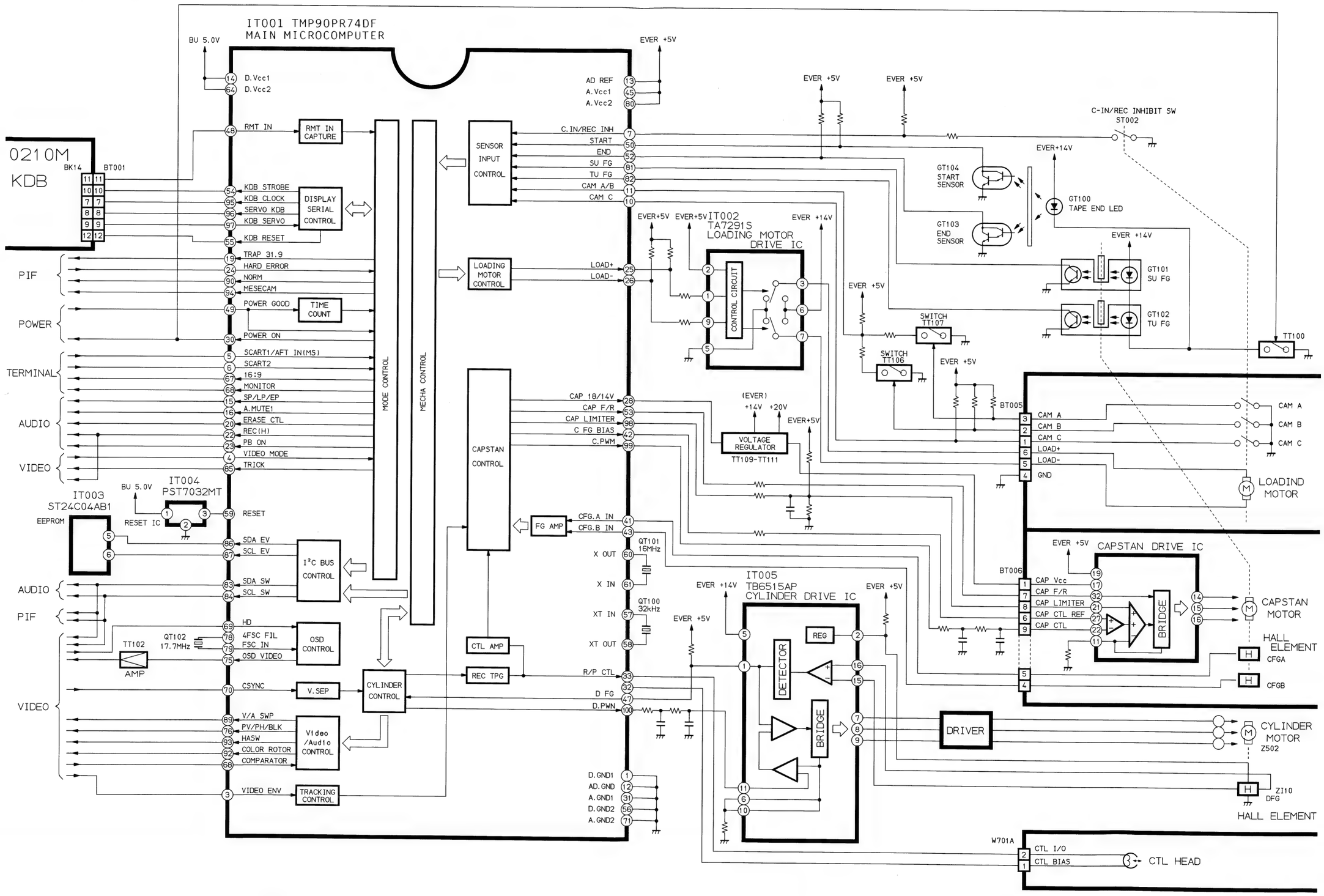
7-3-3. Display Pattern

	6G	5G	4G	3G	2G	1G
P1	◷	1d	VPS	1d	1d	1d
P2		1e	MIX	1e	1e	1e
P3	☞	1c	AGE	1c	1c	1c
P4	●	1g	PDC	1g	1g	1g
P5	P	1f	L	1f	1f	1f
P6	L	1b		1b	1b	1b
P7	S	1a	R	1a	1a	1a
P8	📼	VIDEO	TR	H	M	S
P9	B5	2d		2d	2d	2d
P10	B4	2e		2e	2e	2e
P11	B3	2c		2c	2c	2c
P12	B2	2g		2g	2g	2g
P13	B1	2f		2f	2f	2f
P14	C+	2b		2b	2b	2b
P15	SAT	2a		2a	2a	2a
P16	DT	P.		col :	MONI	

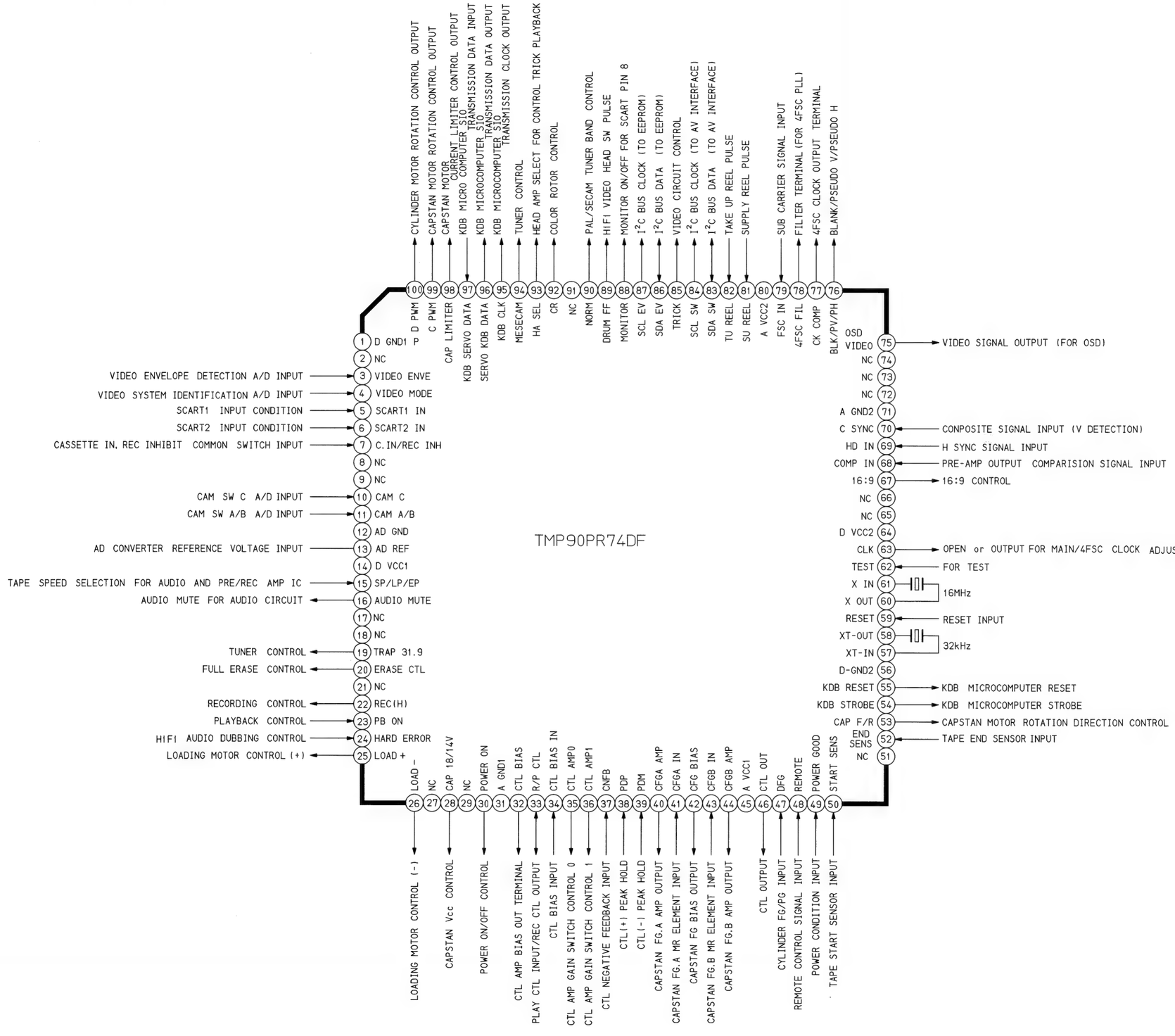
KDB Block Diagram



7-4. Servo/Logic Block Diagram



7-4-1. IT001 Main Microcomputer Terminal Function



7-4-2. IT001 Main Microcomputer Output Polarity

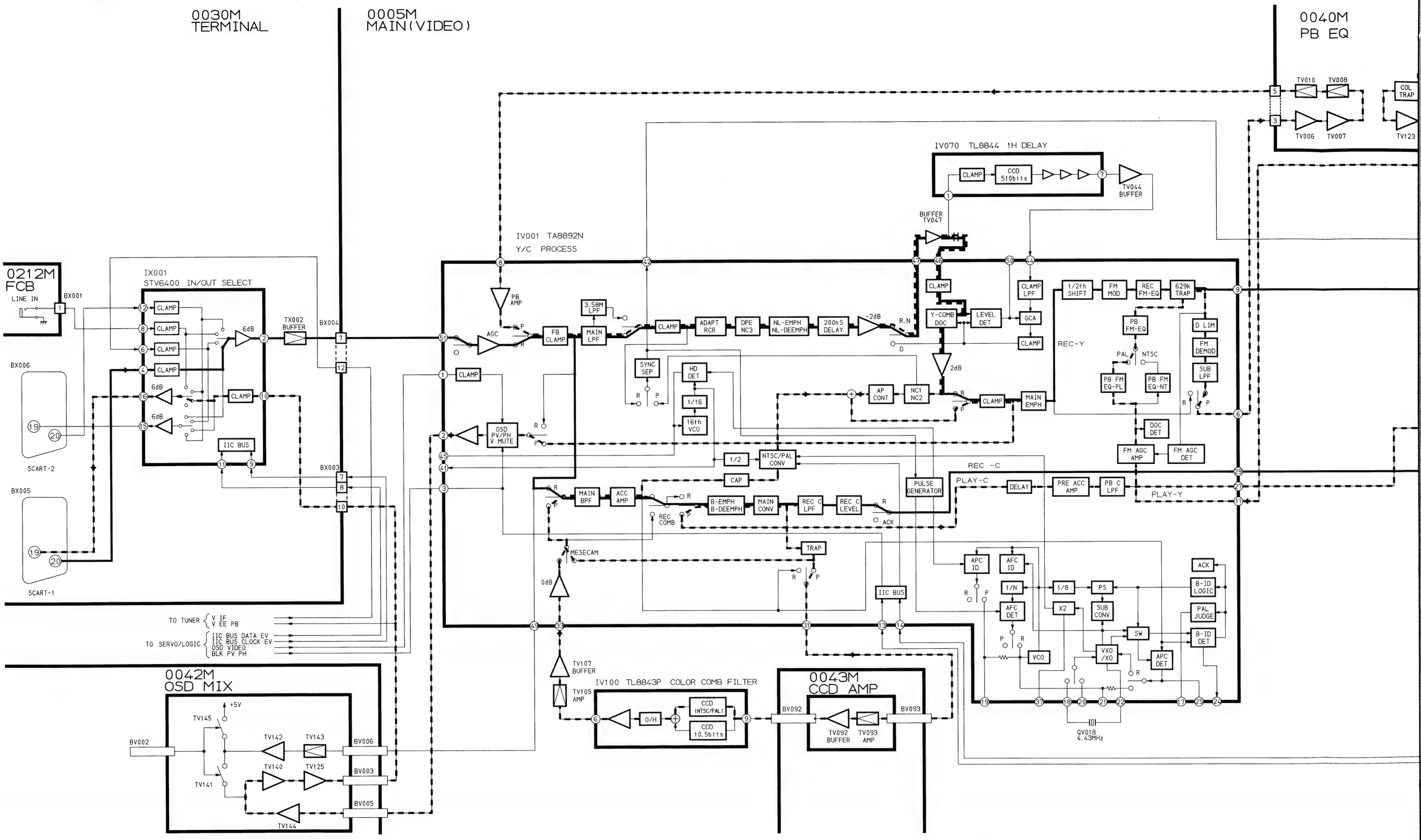
Pin No.	MODE Pin Name	Act.	SLOT IN	SLOT OUT	Load -ing	Un-load -ing	STOP	STAN D-BY	FF	REW	PLAY SP LP	X2 SP LP	CUE SP LP	REV SP LP	STILL SP LP	SLOW SP LP	REC SP LP	REC PAUSE SP LP	POWER OFF	INIT -IAL
16	A.MUTE1	H	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L	H	H
25	LOAD FWD	L	L	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
26	LOAD REV	L	H	L	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H
30	POWER ON	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H
33	R/P CTL	⊓⊔	-	-	-	-	-	-	-	-	-	-	-	-	-	-	⊓⊔	-	-	OPEN
46	CTL OUT	⊓⊔	L	L	L	L	L	L	⊓⊔	←	←	←	←	←	L	⊔⊓	⊓⊔	L	L	L
53	CAP F/R	-	L	H	L	H	H	H	L	H	L	L	L	H	L	⊔⊓	L	L	H	L
54	DSP STB	⊓	⊓	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L
67	S DATA	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L
76	PV/PH/BLNK	4ST	2ST	←	←	←	←	←	←	←	4ST	←	←	←	←	←	←	←	L	4ST
83	I2C DATA1	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	H
84	I2C CLOCK1	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	H
86	I2C DATA2	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	H
87	I2C CLOCK2	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	H
88	S CLK	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	H
89	D-FF	⊓⊔	⊓⊔	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L
91	LP SEARCH	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	OPEN	OPEN
92	CR	⊓⊔	⊓⊔	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	H	L
95	DSP CLK	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L	L
96	DATA M→DSP	▥	▥	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L
98	CAP LIMITER	PWM	L	L	PWM	←	L	PWM	←	←	←	←	←	←	L	PWM	←	←	L	500m
99	C-ERR	PWM	PWM	PWM	PWM	←	L	L	PWM	←	←	←	←	←	L	PWM	←	L	L	L
100	D-ERR	PWM	L	L	PWM	←	L	PWM	←	←	←	←	←	←	←	←	←	←	L	L

7-4-3. Logic Mode Shift Table

KEY / MODE	POWER	STOP	FF	REW	PLAY	PAUSE	SLOW	REC	EJECT	REMAIN COUNT/TIMER	INDEX	COUNTER RESET	TAPE END	TAPE START
POWER OFF	ON	×	×	×	×	×	×	×	○	×	×	×	×	×
STOP	OFF	–	○	○	○	×	×	○	○	○	SERCH	○	S.REW	S.FF
FF	OFF	○	CUE	○	○	×	×	×	○	○	×	○	STOP	×
REW	OFF	○	○	REV	○	×	×	×	○	○	×	○	×	STOP
CUE	OFF	○	※1	REV	○	×	×	×	○	○	×	○	REW	×
REV	OFF	○	CUE	※2	○	×	×	×	○	○	×	○	×	STOP
PLAY	OFF	○	CUE	REV	×	STILL	○	×	○	○	SERCH	○	REW	×
STILL	OFF	○	CUE	REV	FRAME ADV.	PLAY	FRAME ADV.	R.PAUSE	○	○	×	○	REW	×
SLOW	OFF	○	CUE	REV	○	STILL	○	×	○	○	×	○	REW	×
REC	OFF	○	×	×	×	R.PAUSE	×	–	×	○	V.MARK	○	REW	×
REC PAUSE	OFF	○	×	×	×	REC	×	×	×	○	×	○	×	×
VISS MARK	OFF	○	×	×	×	×	×	×	×	×	–	○	REW	×
TIMER STBY	ON	×	×	×	×	×	×	×	×	×	×	×	×	×
TIMER REC	ON	×	×	×	×	×	×	×	×	○	V.MARK	○	STBY	×

※1 : If pressed within 1 second, FF. If not, all CUE.
※2 : If pressed within 1 second, REW. If not, all REVIEW.

7-5. Video Block Diagram



PLAY SIGNAL
REC SIGNAL

0040M
PB EQ

TV010 TV008 BV008
COL TRAP
TV006 TV007 TV123

IV070 TL8844 1H DELAY
CLAMP
CCD 510bits
TV044 BUFFER
BUFFER TV047

IV001 TA8892N
Y/C PROCESS

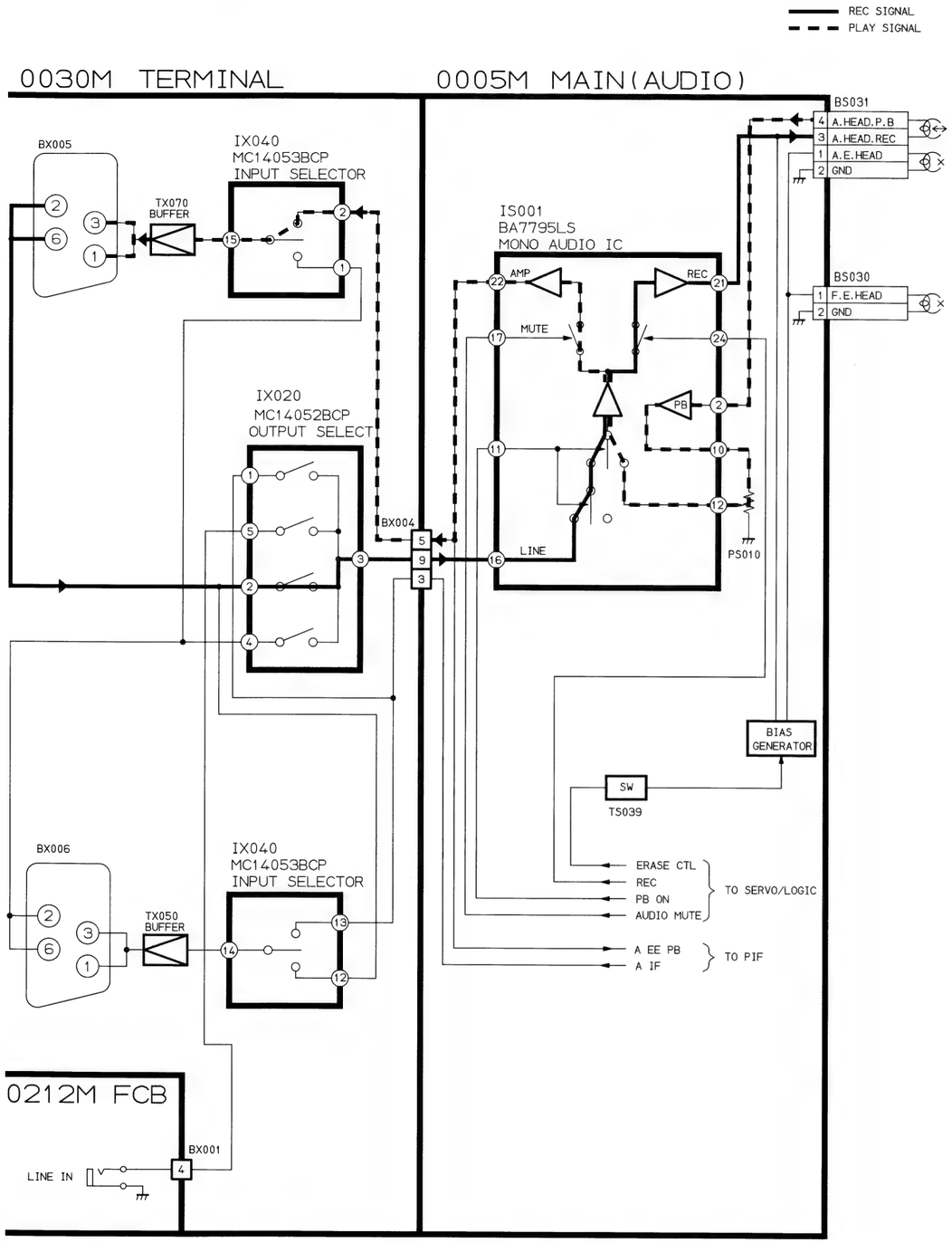
PB AMP
AGC
FB CLAMP
3.58M LPF
MAIN LPF
CLAMP
ADAPT RCR
DPE NC3
NL-EMPH NL-DEEMPH
200nS DELAY
-2dB
R.N
D
CLAMP
Y-COMB DOC
LEVEL DET
GCA
CLAMP
CLAMP LPF
2dB
SYNC SEP
HD DET
1/16
16fh VCO
AP CONT
NC1 NC2
CLAMP
MAIN EMPH
1/2fh SHIFT
FM MOD
REC FM-EQ
629k TRAP
REC-Y
PB FM-EQ
PAL
NTSC
PB FM EQ-PL
PB FM EQ-NT
D LIM
FM DEMOD
SUB LPF
DOC DET
FM AGC AMP
FM AGC DET
OSD PV/PH V MUTE
1/2
NTSC/PAL CONV
CAP
REC -C
PULSE GENERATOR
PLAY-C
DELAY
PRE ACC AMP
PB C LPF
PLAY-Y
MAIN BPF
ACC AMP
B-EMPH B-DEEMPH
MAIN CONV
REC C LPF
REC C LEVEL
REC COMB
ACK
TRAP
MESECAM
0dB
IIC BUS
APC ID
AFC ID
1/N
AFC DET
1/8
X2
PS
SUB CONV
SW
VXO /XO
VCO
APC DET
ACK
B-ID LOGIC
PAL JUDGE
B-ID DET
QV018 4.43MHz
TV107 BUFFER
TV105 AMP
IV100 TL8843P COLOR COMB FILTER
CCD (NTSC/PAL)
CCD 10.5bits
O/H
0043M
CCD AMP
BV092
BV093
TV092 BUFFER
TV093 AMP

CYLINDER
PRE AMP
BV001
TV052 TV029
TV131
TV130 +5V

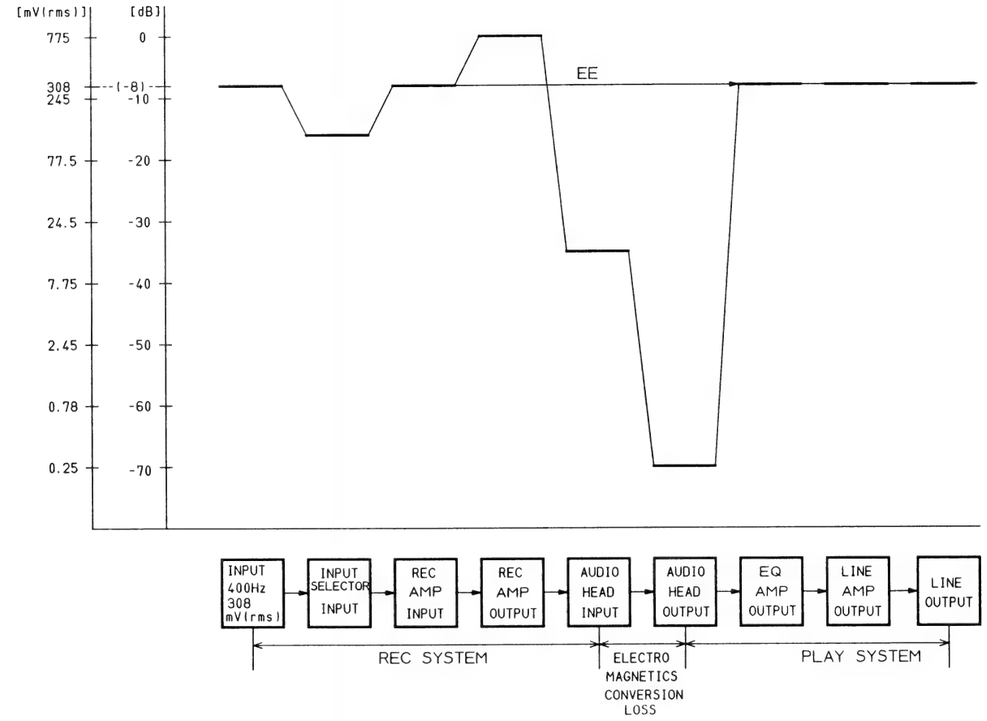
0041M CHR DLY
BV027
TV061 TV060
TRAP
BV025
BV024
TV002
BV026
BV029
BPF

MESECAM
REC(H)
IIC BUS CLOCK SW
IIC BUS DATA SW
} TO SERVO/LOGIC

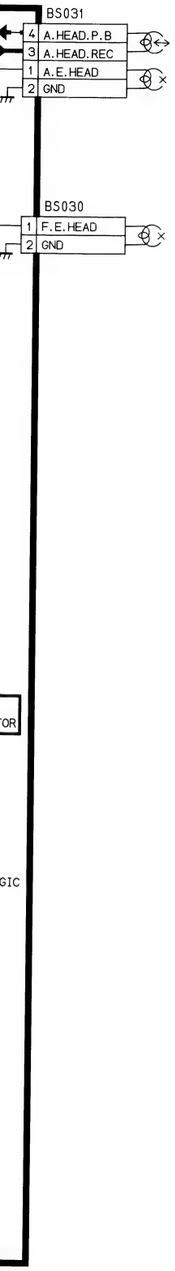
7-6. Audio Block Diagram



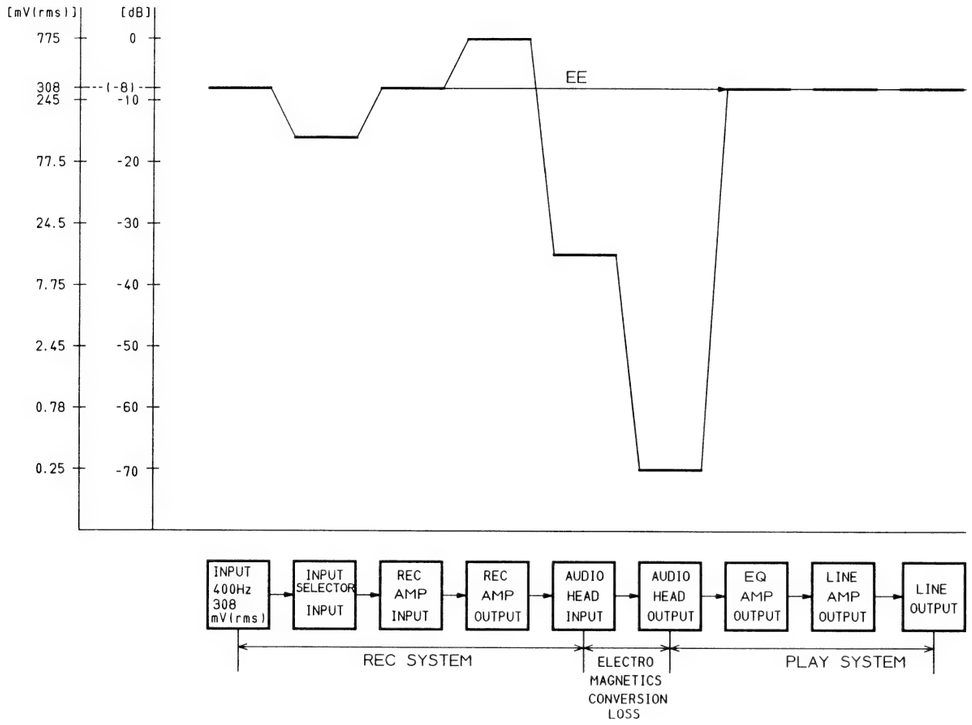
7-6-1. Conventional Audio Level Chart



REC SIGNAL
PLAY SIGNAL



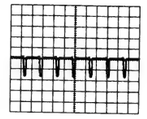
7-6-1. Conventional Audio Level Chart



8. CIRCUIT DIAGRAMS

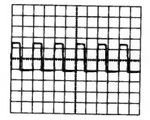
8-1. Power Circuit Diagram

① IP002, Pin ① D-7



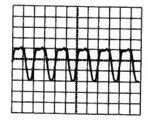
V:5V/div
H:20µs/div

② IP002, Pin ⑦ F-8



V:2V/div
H:10ms/div

③ IP001, Pin ① D-3

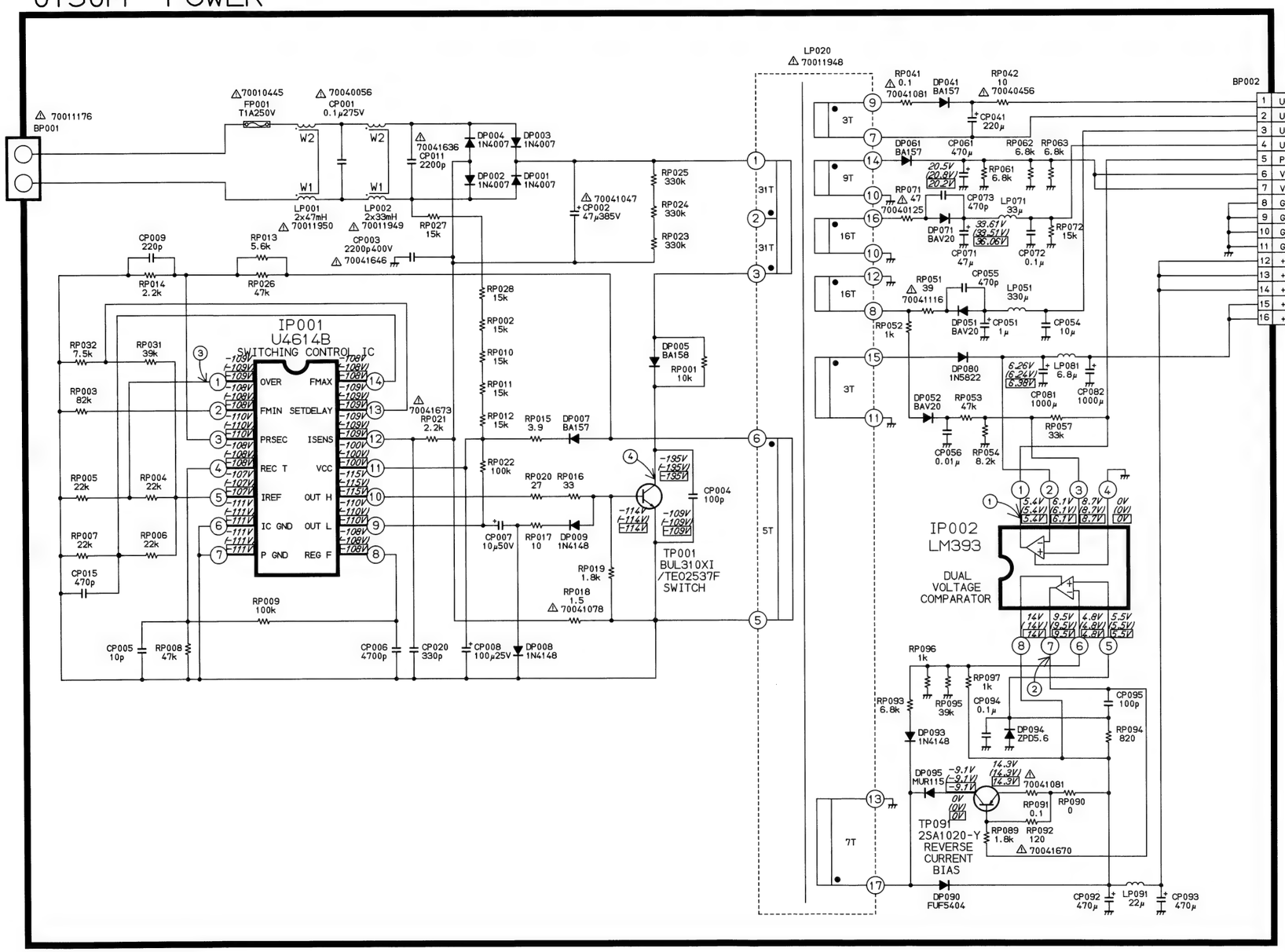


V:100V/div
H:10ms/div

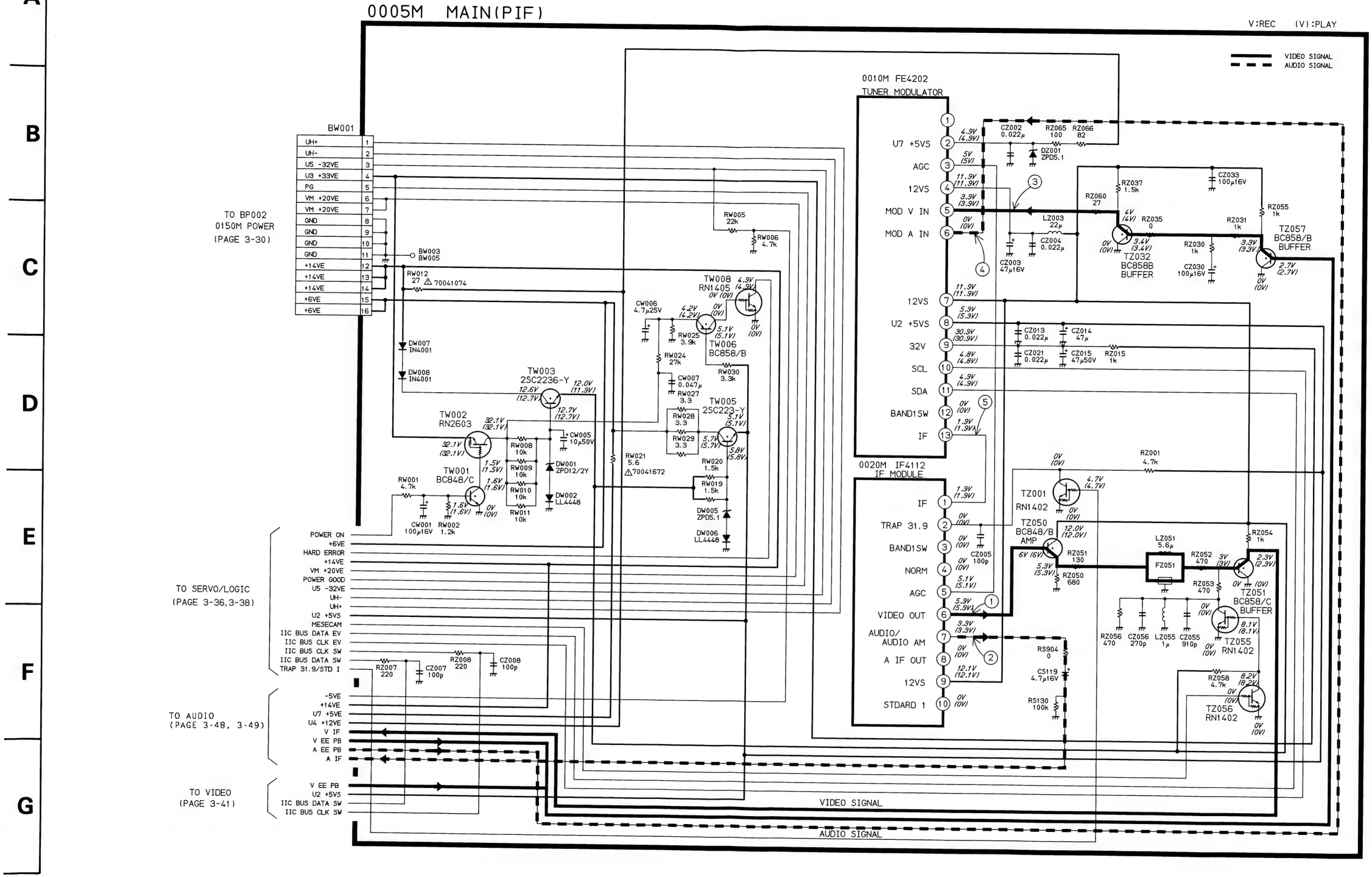
④ TP001, Collector D-5

V:100V/div
H:10µs/div

0150M POWER


V :REC
(V):PLAY
[V] :EE
TO BW001
0005M MAIN(PIF)
(PAGE 3-31)
BP001
BP002
IP001
U4614B
SWITCHING CONTROL IC
OVER
FMAX
FMIN
SETDELAY
PRSEC
ISENS
REC T
VCC
IREF
OUT H
IC GND
OUT L
P GND
REG F
IP002
LM393
DUAL
VOLTAGE
COMPARATOR
TP001
BUL310XI
/TE02537F
SWITCH
TP091
2SA1020-Y
REVERSE
CURRENT
BIAS
LP020
70011948
UH+
UH-
U5 -32VE
U3 +33VE
POWER GOOD
VM +20VE
VM +20VE
GND
GND
GND
GND
+14VE
+14VE
+14VE
+6VE
+6VE

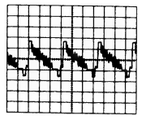
8-2. PIF Circuit Diagram



A B C D E F G

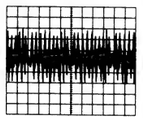
8-3. KDB Circuit Diagram

① 0020M, Pin ⑥ E-8



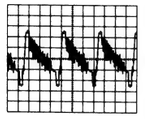
VIDEO OUT
V:1V/div
H:20μs/div

② 0020M, Pin ⑦ F-8



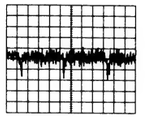
AUDIO
V:20mV/div
H:5ms/div

③ 0010M, Pin ⑤ B-8



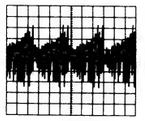
MOD V IN
V:200mV/div
H:20μs/div

④ 0010M, Pin ⑥ C-8

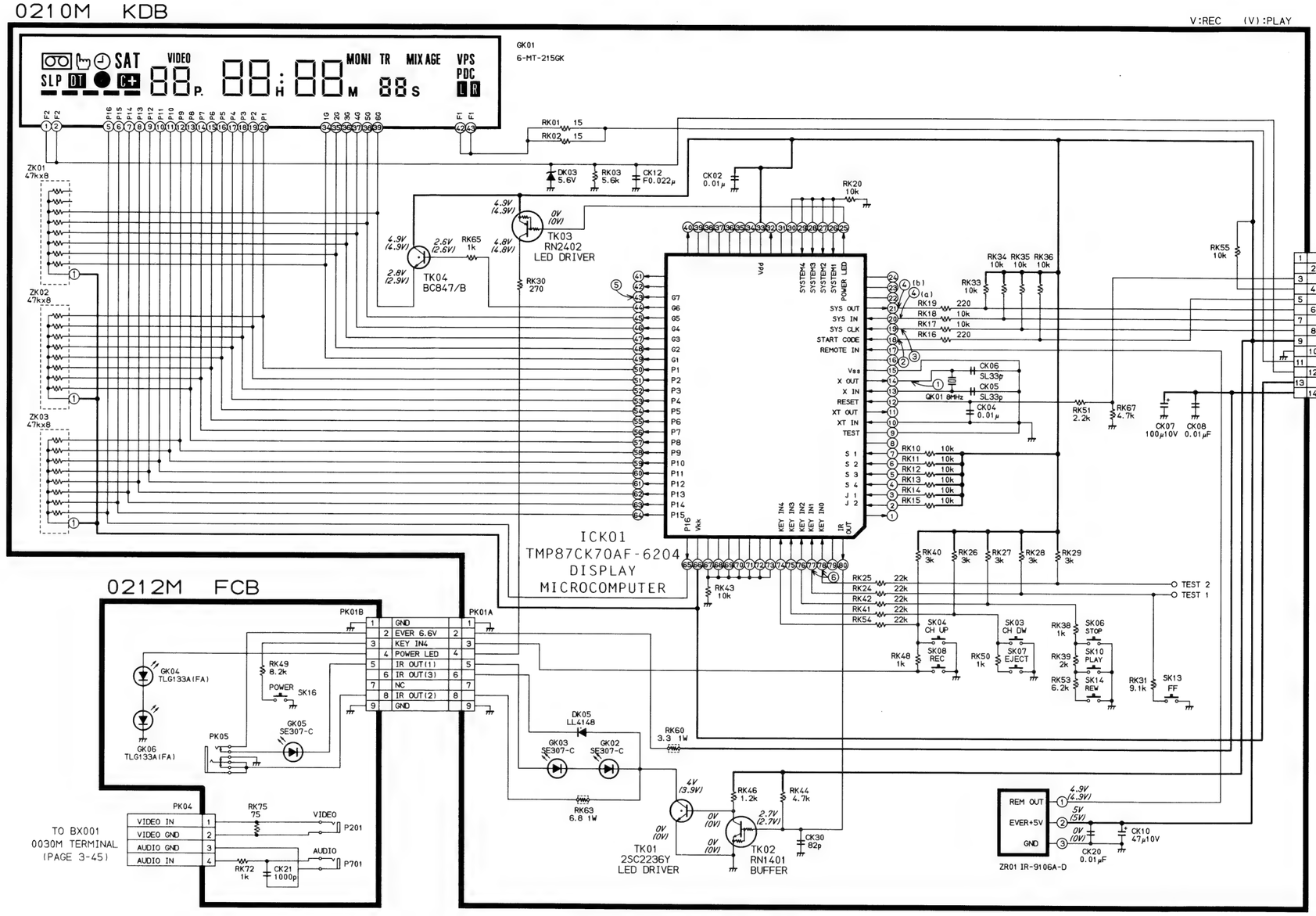


MOD A IN
V:500mV/div
H:5ms/div

⑤ 0010M, Pin ⑬ D-8

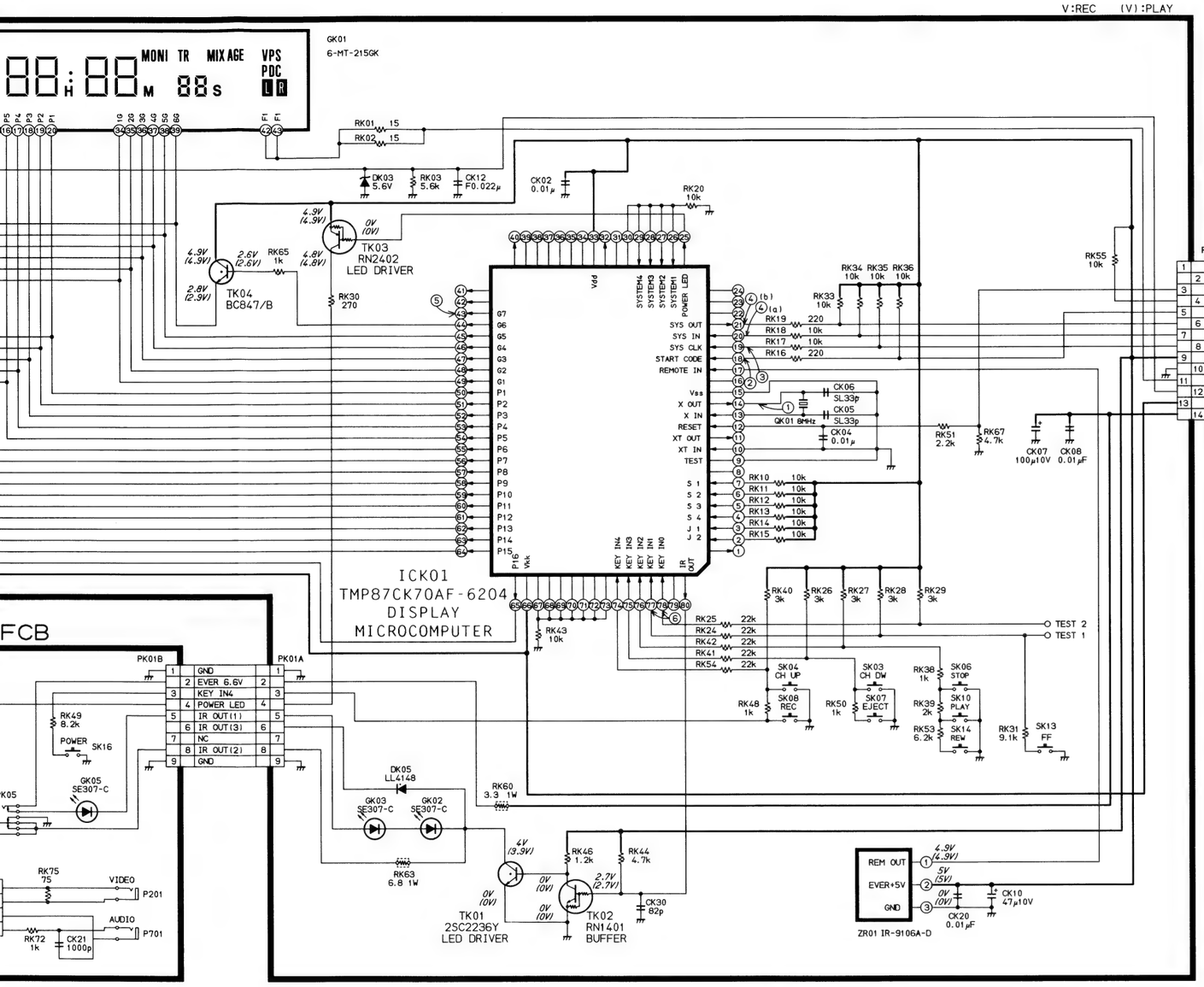


IF
V:20mV/div
H:20μs/div

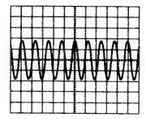


3	KEY DISPLAY KEY DISPLAY	4	5	6	7	8	9

ram

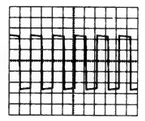


① ICK01,Pin ⑭ D-6



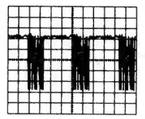
X-OUT
V:1V/div
H:0.1μs/div

② ICK01,Pin ⑱ C-6



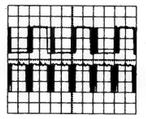
START CODE
V:1V/div
H:10ms/div

③ ICK01,Pin ⑲ C-6



CLOCK
V:1V/div
H:5ms/div

④ ICK01
(a) Pin ⑳ (DATA IN) C-6
(b) Pin ㉑ (DATA OUT) C-6

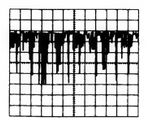


(a)
(b)
V:2V/div
H:10ms/div

⑤ ICK01,Pin ㊸ C-5

V:10V/div
H:500μs/div

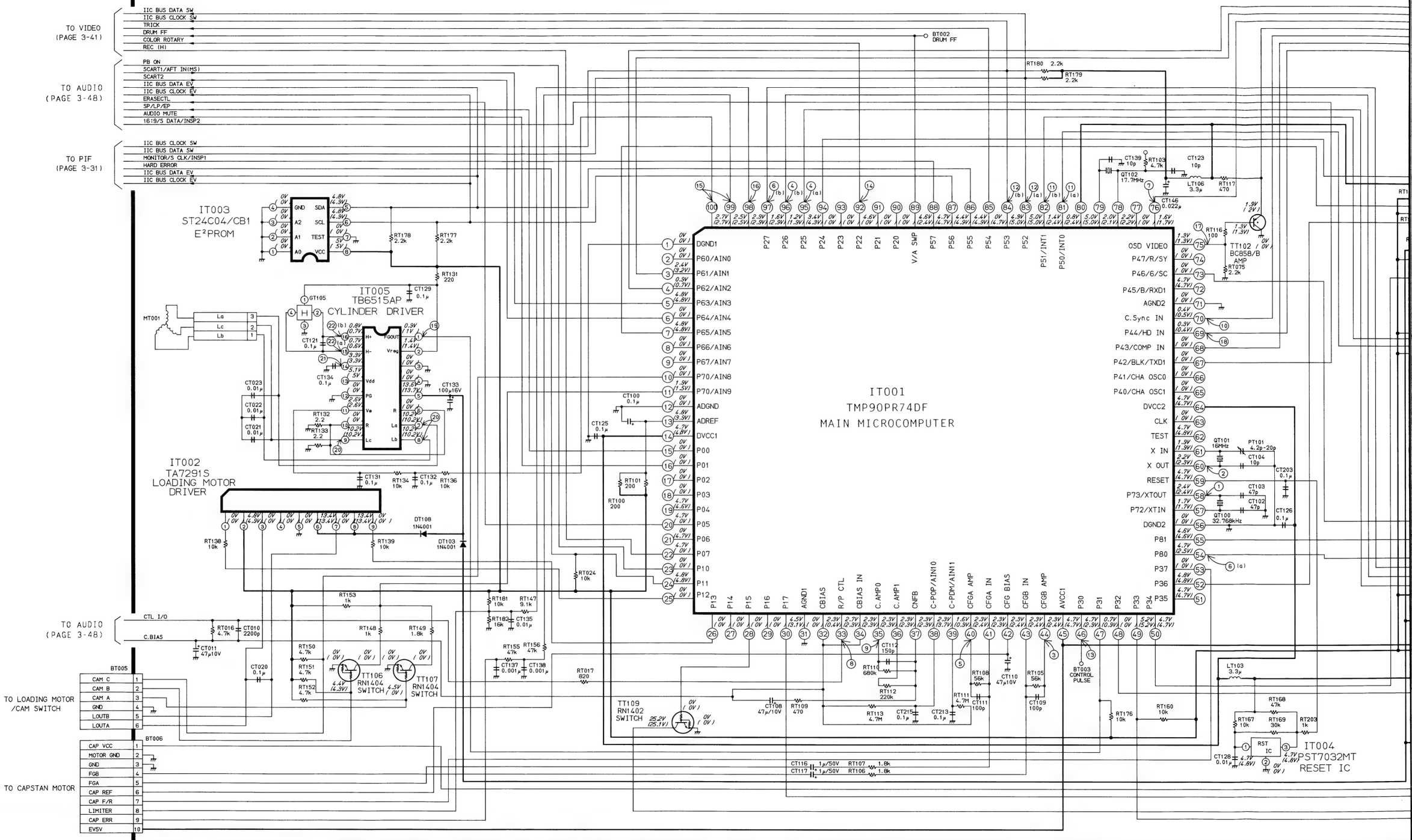
⑥ ICK01,Pin ㊼,㊽ E-6



V:200mV/div
H:5ms/div

8-4. Servo/Logic Circuit Diagram

0005M MAIN(SERVO/LOGIC)



V:REC (V):PLAY

VIDEO MODE
VIDEO ENV
BLK/PV/PH
OSD VIDEO OUT
C SYNC
COMPARATOR
HD
→ TO VIDEO (PAGE 3-41)

MESECAM
U2 +5VS
→ TO PIF (PAGE 3-31)

BT002 DRUM FF

IT001
TMP90PR74DF
MAIN MICROCOMPUTER

DGND1
P60/AIN0
P61/AIN1
P62/AIN2
P63/AIN3
P64/AIN4
P65/AIN5
P66/AIN6
P67/AIN7
P70/AIN8
P70/AIN9
ADGND
ADREF
DVCC1
P00
P01
P02
P03
P04
P05
P06
P07
P10
P11
P12
P13 P14 P15 P16 P17 AGND1 CBIAS R/P CTL CBIAS IN C.AMP0 C.AMP1 CNFB C-POP/AIN10 C-PDM/AIN11 CFGA AMP CFGA IN CFG BIAS CFGB IN CFGB AMP AVCC1 P30 P31 P32 P33 P34 P35
P51/INT1 P50/INT0
V/A SWP P57 P56 P55 P54 P53 P52
OSD VIDEO
P47/R/SY
P46/6/SC
P45/B/RXD1
AGND2
C.Sync IN
P44/HD IN
P43/COMP IN
P42/BLK/TXD1
P41/CHA OSC0
P40/CHA OSC1
DVCC2
CLK
TEST
X IN
X OUT
RESET
P73/XTOUT
P72/XTIN
DGND2
P81
P80
P37
P36
P35

QT102 17.7MHz
CT139 10p
RT103 4.7k
CT123 10p
LT106 3.3μ
RT117 470
CT146 0.022μ
RT116 100
TT102 BC858/B AMP
RT075 2.2k
RT180 2.2k
RT179 2.2k
RT177 2.2k
RT131 220
RT136 10k
CT133 100μ16V
DT103 1N4001
CT100 0.1μ
CT125 0.1μ
RT101 200
RT100 200
RT024 10k
RT181 10k
RT182 16k
RT147 9.1k
CT135 0.01μ
RT155 47k
RT156 47k
CT137 0.001μ
CT138 0.001μ
RT017 820
TT109 RN1402 SWITCH
CT108 47μ/10V
RT109 470
CT112 150p
RT110 680k
RT112 220k
RT113 4.7M
CT215 0.1μ
CT213 0.1μ
RT111 4.7M
CT111 100p
RT108 56k
CT110 47μ10V
RT105 56k
CT109 100p
BT003 CONTROL PULSE
RT160 10k
RT176 10k
CT116 1μ/50V
CT117 1μ/50V
RT107 1.8k
RT106 1.8k

LT103 3.3μ
RT168 47k
RT167 10k
RT169 30k
RT203 1k
RST IC
CT128 0.01μ
IT004 PST7032MT RESET IC

QT101 16MHz
PT101 4.2p-20p
CT104 10p
CT103 47p
CT102 47p
QT100 32.768kHz
CT203 0.1μ
CT126 0.1μ

RT145 10k
ST002
C-IN/ REC-INH SW
CT120 0.001μ
RT129 22k
GT104 PT493F
END SENSOR
GT100 GL451V
RT171 150
RT170 180
RT125 180
GT103 PT493F
START SENSOR
RT128 27k
CT119 0.001μ
TU FG
GT102 GP15562
RT127 5.6k
RT126 5.6k
RT124 820
SU FG
GT101 GP15562
TT100 BCB48/B SWITCH
RT130 4.7k

CT012 220p
CT013 220p
CT014 0.001μ

BT001 I/O

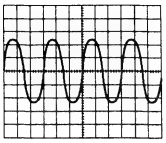
14	CAMERA PAUSE
13	NC
12	KDB RESET
11	REMOTE
10	KDB STOROBE
9	KDB SERVO DATA
8	SERVO KDB DATA
7	KDB CLOCK
6	+5VD
5	GND
4	UH+
3	UH-
2	U5 -32VE
1	+6V1R

→ TO PK02 0210M KDB (PAGE 3-35)

DT202 1N4001
70041236 RT135 6V 1.0
DT104 1N4001
CT204 0.1μ
TT200 BC337/40
RT200 1.5k
RT202 1.5k
LT105 33μ
RT201 1.5k
CT145 470μ16V
DT203 1N4001
CT202 220μ
TT101 BC848/C
DT204 1N4148
DT205 1N4148
DT107 1N4001
CT201 47μ
CT200 0.1μ
DT200 2MM4.7
DT201 LL4448
RT159 2.2k
TT111 2SA1020Y SWITCH
DT102 1N4001
RT166 220
RT163 220
RT165 0
TT110 BCB57/C SWITCH
CT142 0.1μ
TT104 BC848/C
CT141 0.1μ
RT162 10k
RT164 10k

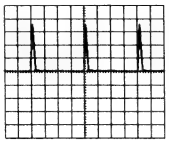
+14VE
U5 -32VE
UH-
UH+
VM +20VE
+6VE
POWER GOOD
→ TO PIF (PAGE 3-31)

① IT001, Pin ㊽ E-11



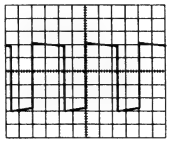
XT-OUT
V:1V/div
H:10µs/div

⑦ IT001, Pin ㊻ C-10



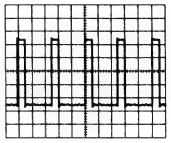
PV/PH/BLK
STILL
V:1V/div
H:5ms/div

⑬ IT001, Pin ㊻ F-10



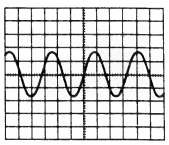
CTL OUT
V:1V/div
H:10ms/div

⑲ IT005, Pin ① D-5



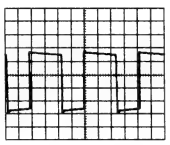
FoOUT
V:1V/div
H:2ms/div

② IT001,Pin ㊿ E-11



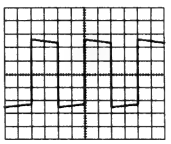
X–OUT
V:1V/div
H:0.02µs/div

⑧ IT001, Pin ㉝ F-8



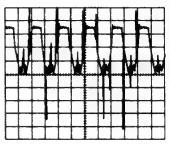
R/P CTL
(REC)
V:1V/div
H:10ms/div

⑭ IT001, Pin ㉜ C-8



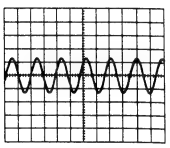
CR (SP)
V:1V/div
H:10ms/div

⑳ IT005,
Pin ⑦, ⑧ D-5
Pin ⑨ E-4



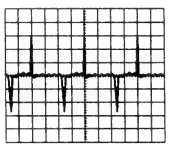
La, Lb, Lc
V:2V/div
H:5ms/div

③ IT001, Pin ㊹ F-9



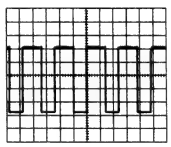
CPGB.AMP
V:500mV/div
H:500µs/div

⑨ IT001, Pin ㉟ F-8



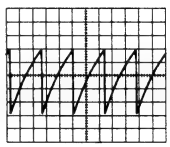
C AMP0 (SP)
V:500mV/div
H:10ms/div

⑮ IT001, Pin ㊾, ㊿ C-7



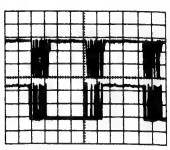
CPWM
V:1V/div
H:10µs/div

㉑ IT005, Pin ⑭ D-4



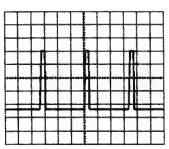
V:1V/div
H:50ms/div

④ IT001
(a) Pin ㊺ (SCLK0) C-8
(b) Pin ㊻ (SDA OUT) C-7



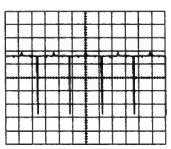
(a)
(b)
V:2V/div
H:5ms/div

⑩ IT001, Pin ㊿ D-11



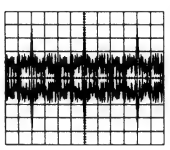
CSYNC
V:1V/div
H:20µs/div

⑯ IT001, Pin ㊽ C-7



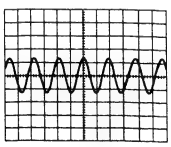
CAP
V:500mV/div
H:20µs/div

㉒ IT005
(a) Pin ⑮ (H–) D-4
(b) Pin ⑯ (H+) D-4



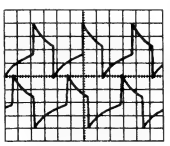
(a)
(b)
V:100mV/div
H:10ms/div

⑤ IT001, Pin ㊵ F-9



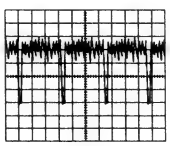
CPGA.AMP
V:200mV/div
H:500µs/div

⑪ IT001
(a) Pin ㊶ (SU FG) C-10
(b) Pin ㊷ (TU FG) C-9



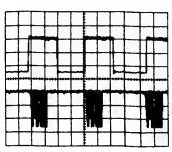
(a)
(b)
V:2V/div
H:200ms/div

⑰ IT001, Pin ㊺ C-11



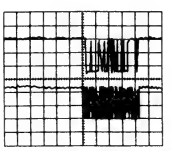
OSD
VIDEO
V:50mV/div
H:20µs/div

⑥ IT001
(a) Pin ㊹ (STB) E-11
(b) Pin ㊼ (SDA IN) C-7



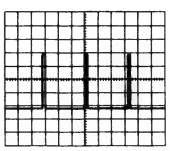
(a)
(b)
V:2V/div
H:5ms/div

⑫ IT001
(a) Pin ㊸ (SDA1) C-9
(b) Pin ㊹ (SCL1) C-9



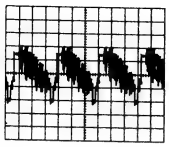
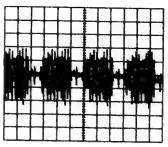
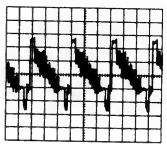
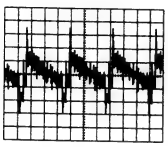
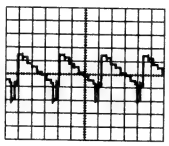
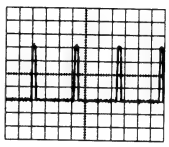
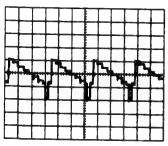
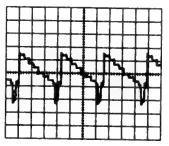
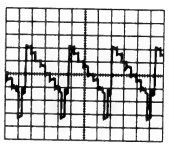
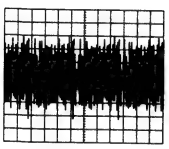
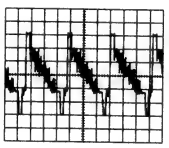
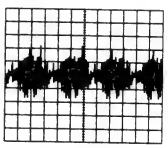
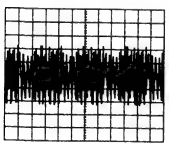
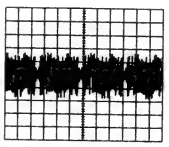
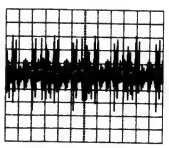
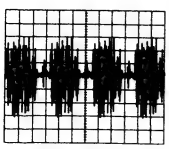
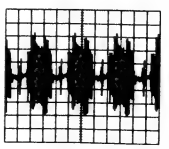
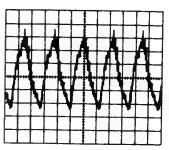
(a)
(b)
V:2V/div
H:200µs/div

⑱ IT001, Pin ㊾ D-11



HD IN
V:1V/div
H:20µs/div

8-5. Video Circuit Diagram

① IV001, Pin ② E-5  PLAY V:500mV/div H:20μs/div	⑦ IV001, Pin ㉝ C-8  PLAY V:100mV/div H:20μs/div	⑬ IV001, Pin ㊾ C-5  REC V:100mV/div H:20μs/div
② IV001, Pin ⑥ E-5  PLAY V:100mV/div H:20μs/div	⑧ IV001, Pin ㊻ C-6  PLAY V:100mV/div H:20μs/div	⑭ IV070, Pin ③ B-5  PLAY V:1V/div H:20μs/div
③ IV001, Pin ⑧ E-6  PLAY V:100mV/div H:20μs/div	⑨ IV001, Pin ㊼ C-6  PLAY V:200mV/div H:20μs/div	⑮ IV070, Pin ⑦ B-6  PLAY V:100mV/div H:20μs/div
④ IV001, Pin ⑪ E-6  PLAY V:75mV/div H:20μs/div	⑩ IV001, Pin ㊶ C-5  EE/REC V:200mV/div H:20μs/div	⑯ IV100, Pin ⑥ C-12  PLAY V:100mV/div H:20μs/div
⑤ IV001, Pin ㉗ E-9  PLAY V:50mV/div H:20μs/div	⑪ IV001, Pin ⑨ E-6  REC V:200mV/div H:20μs/div	⑰ IV100, Pin ⑥ C-12  REC V:100mV/div H:20μs/div
⑥ IV001, Pin ㉛ C-8  PLAY V:75mV/div H:20μs/div	⑫ IV001, Pin ㉙ C-9  REC V:50mV/div H:20μs/div	⑱ IV100, Pin ⑯ D-11  REC V:50mV/div H:0.1μs/div

0005M MAIN(VIDEO)

IV070
TL8844
1H DELAY

IV001
TA8892N
Y/C PROCESS

IV100
TL8843P
C.COMB FILTER

TV045 RN1402 SWITCH
TV046 RN1402 SWITCH
TV047 BC858/B BUFFER
TV044 BC848/B BUFFER
TV035 RN1402 SWITCH
TV038 RN1402 SWITCH
TV041 RN1402 SWITCH
TV039 RN1402 AMP
TV037 RN1402 SWITCH
TV036 RN1402 SWITCH
TV107 BC848/B BUFFER
TV111 BC848/B BUFFER
TV112 BC848/B
TV052 BC858/B BUFFER
TV029 BC848/B BUFFER
TV131 BC858/B BUFFER
TV137 RN1402 SWITCH
TV130 BC848/C SWITCH
TV022 BC848/B BUFFER

BV009
GND 1
U2 +5VS 2
PB DE-MOD 3
SP-LP-EP 4
PB DE-EMPH 5
TO BV009 0040M PBEQ (PAGE 3-44)

BV008
PB YC 1
GND 2
PB-FM 3
TO BV008 0040M PBEQ (PAGE 3-44)

BV048
SEARCH-H 1
SEC-L 2
TO BV048 0040M PBEQ (PAGE 3-44)

BV007
U2 +5VS
BV006
AGC VIDEO
BV005
VIDEO OUT
BV004
GND
BV003
V-EE-PB
BV002
MIX-L
TO BV002-BV007 0042M OSD MIX (PAGE 3-44)

TO AUDIO (PAGE 3-48)
V-EE-REC

TO SERVO/LOGIC (PAGE 3-36,3-38)
TRICK
V-EE-PB
HD
CSYNC
COLOR-ROTOR
OSD-VIDEO
BLKPVPH
IIC-BUS-DATA-SW
IIC-BUS-CLK-SW
REC
DRUM-FF
VIDEO MODE
VIDEO-ENV
COMPARATOR
MESECAM

TO PIF (PAGE 3-31)
U2 +5VS

PLAY/EE SIGNAL
PLAY Y SIGNAL
REC Y SIGNAL
PLAY C SIGNAL
REC C SIGNAL

V:REC (V):PLAY

REC SIGNAL
PLAY SIGNAL

IV070
TL8844
1H DELAY

TV044 BC848/B BUFFER
TV038 RN1402 SWITCH
TV039 RN1402 AMP
TV041 RN1402 SWITCH
TV035 RN1402 SWITCH
TV037 RN1402 SWITCH
TV036 RN1402 SWITCH
TV047 BC858/B BUFFER
TV046 BUFFER
RN1402 SWITCH

TV107 BC848/B BUFFER

IV100
TL8843P
C.COMB FILTER

TV111 BC848/B BUFFER
TV112 BC848/B
TV105 BC848/B AMP

0043M CCD AMP

PLAY C SIGNAL

TV093 BC848/B AMP
TV092 BC848/B BUFFER

BV093 C-COMB DRIVER
BV092 CCD-C-COMB
BV091 GND
BV090 FSC
BV094 U2 +5VS

TV052 BC858/B BUFFER
TV029 BC848/B BUFFER
TV131 BC858/B BUFFER
TV137 RN1402 SWITCH
TV130 BC848/C SWITCH

BV001
1 GND
2 REC-YC
3 U2 +5VS
4 CSYNC
5 DFFHASEL
6 V-ENV
7 COMP
8 PB-YC1
9 NC
10 GND

TO CYLINDER

BV100
1 VIDEO MODE
2 CHPOMA IN
3 GND
4 U2 +5VS
5 GND
6 BGP

NOT USED

0041M CHR DLY

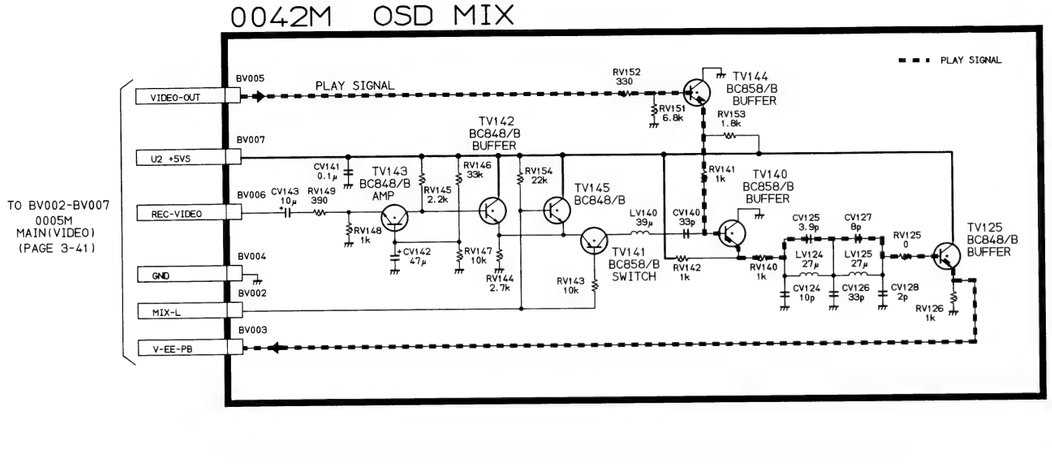
TV002 RN1402 SWITCH
TV061 BC848/B BUFFER
TV060 BC858/B BUFFER

BV024 MESECAM
BV025 PB YC
BV026 Y/C MIX
BV027 PB C
BV028 GND
BV029 REC C
BV030 U2 +5VS

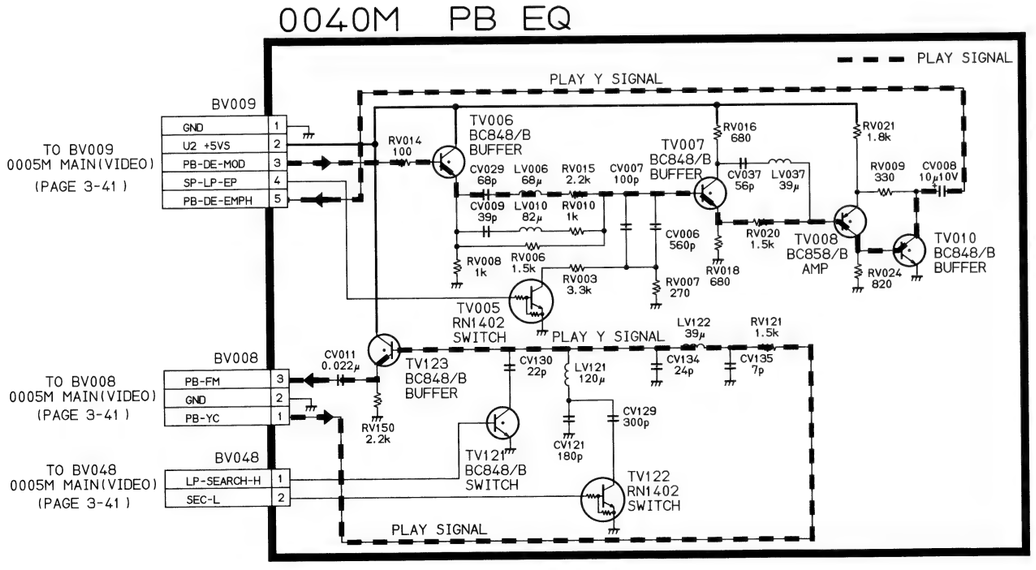
PLAY Y SIGNAL
REC Y SIGNAL
PLAY C SIGNAL
REC C SIGNAL

TV022 BC848/B BUFFER

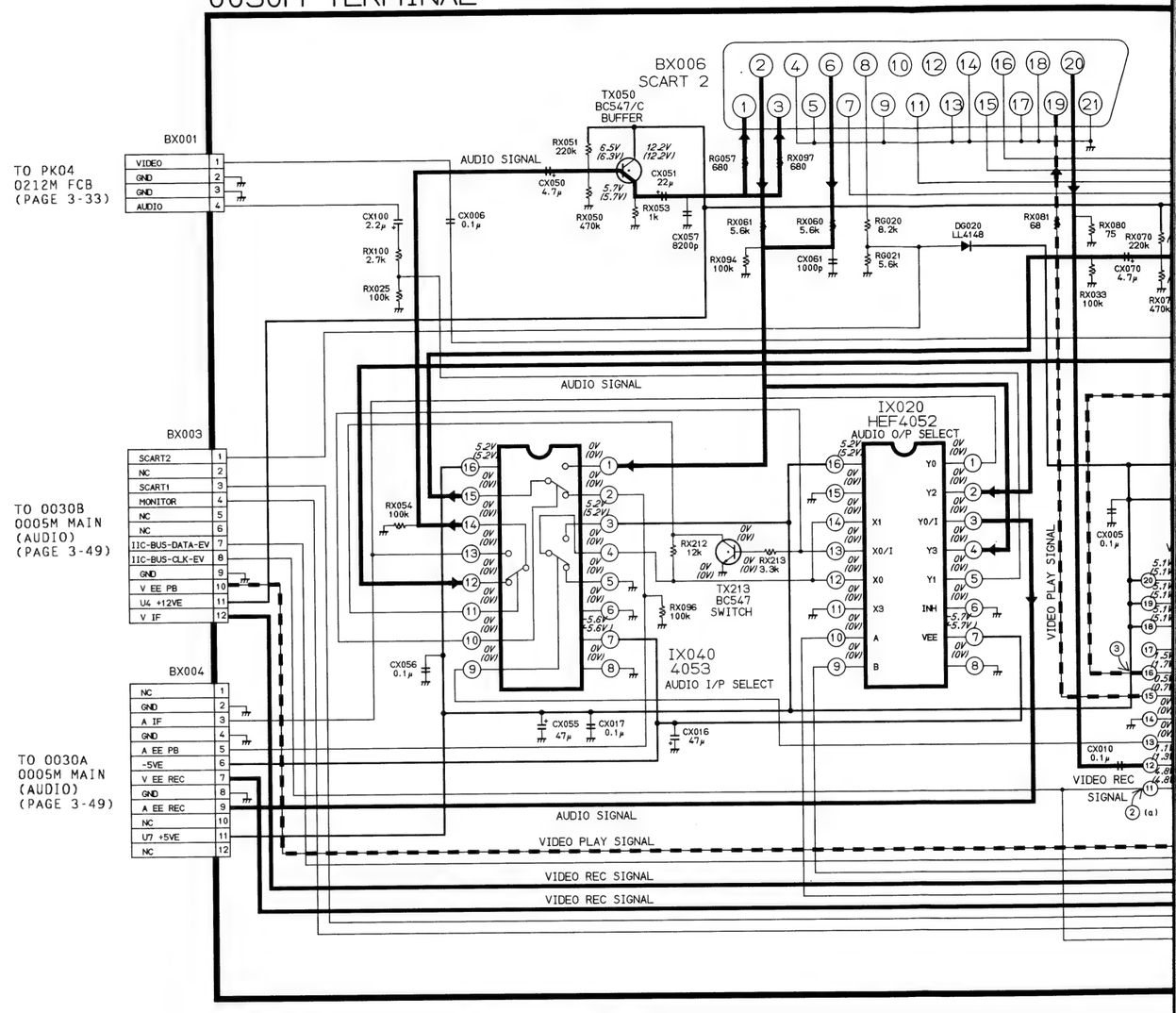
8-6. OSD MIX Circuit Diagram



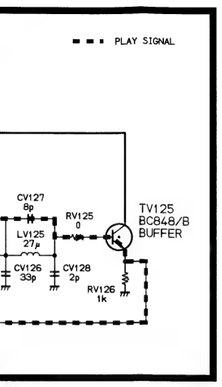
8-7. PB EQ Circuit Diagram

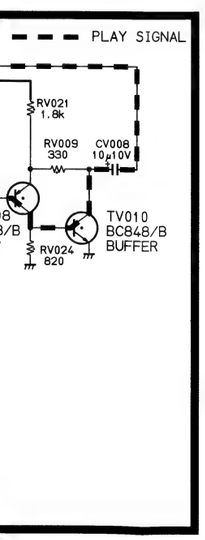


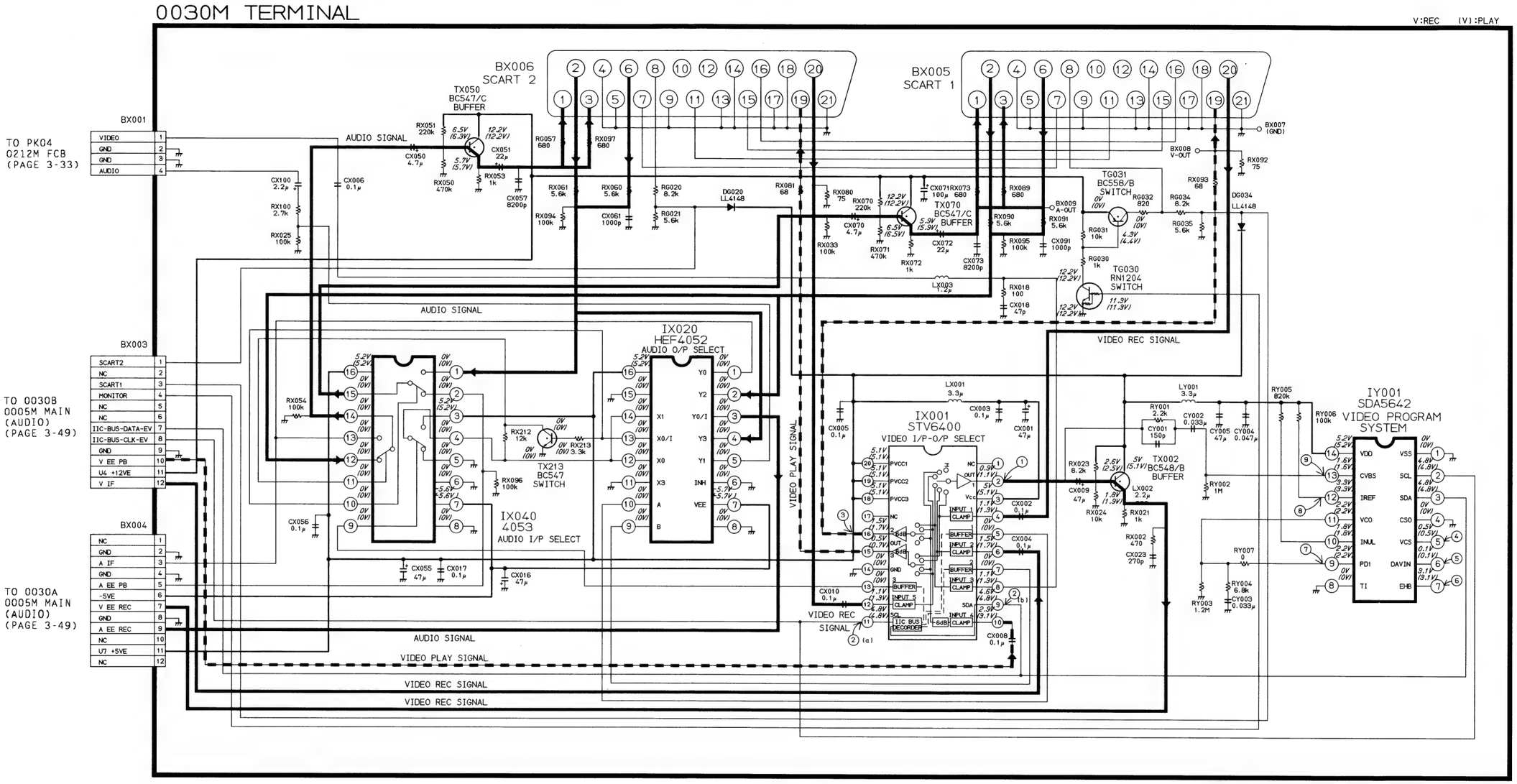
8-8. Terminal Circuit Diagram



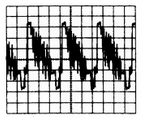
8-8. Terminal Circuit Diagram





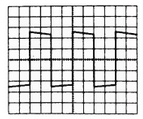


① IX001, Pin ② D-13



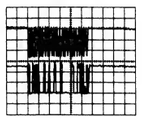
V:200mV/div
H:20µs/div

⑥ IY001, Pin ⑦ E-16



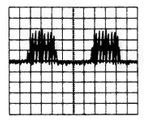
V:1V/div
H:10ms/div

② IX001
(a) Pin ⑪ (SCL) E-12
(b) Pin ⑨ (SDA) E-13



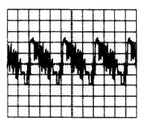
(a)
(b)
V:2V/div
H:200µs/div

⑦ IY001, Pin ⑨ E-15



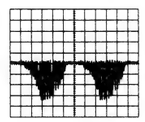
V:100mV/div
H:50ms/div

③ IX001, Pin ⑯ E-12



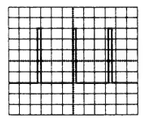
V:500mV/div
H:20µs/div

⑧ IY001, Pin ⑫ E-15



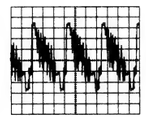
V:200mV/div
H:50ms/div

④ IY001, Pin ⑤ E-16



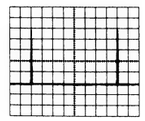
VCS
V:1V/div
H:20µs/div

⑨ IY001, Pin ⑬ D-15



V:200mV/div
H:20µs/div

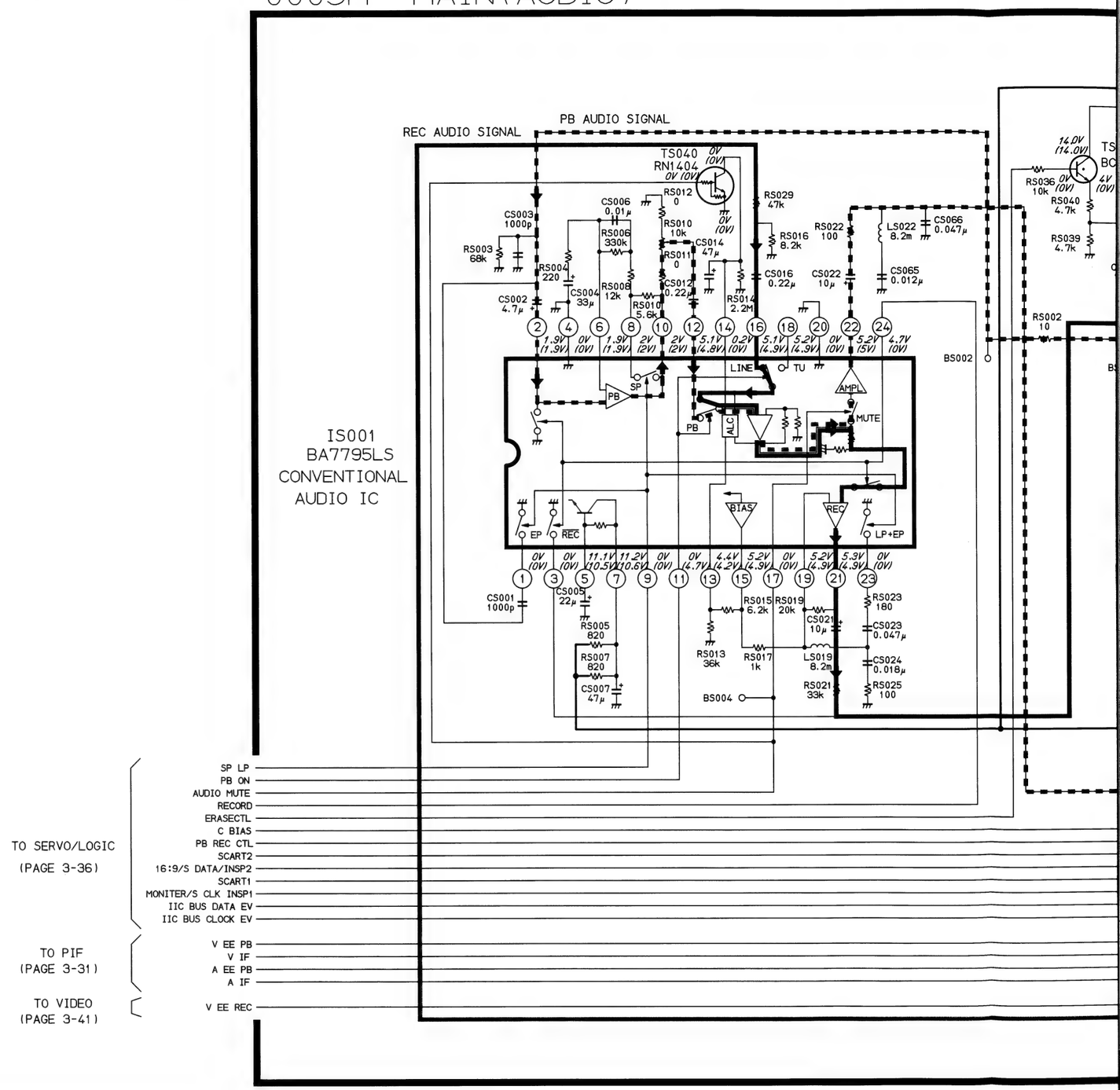
⑤ IY001, Pin ⑥ E-16



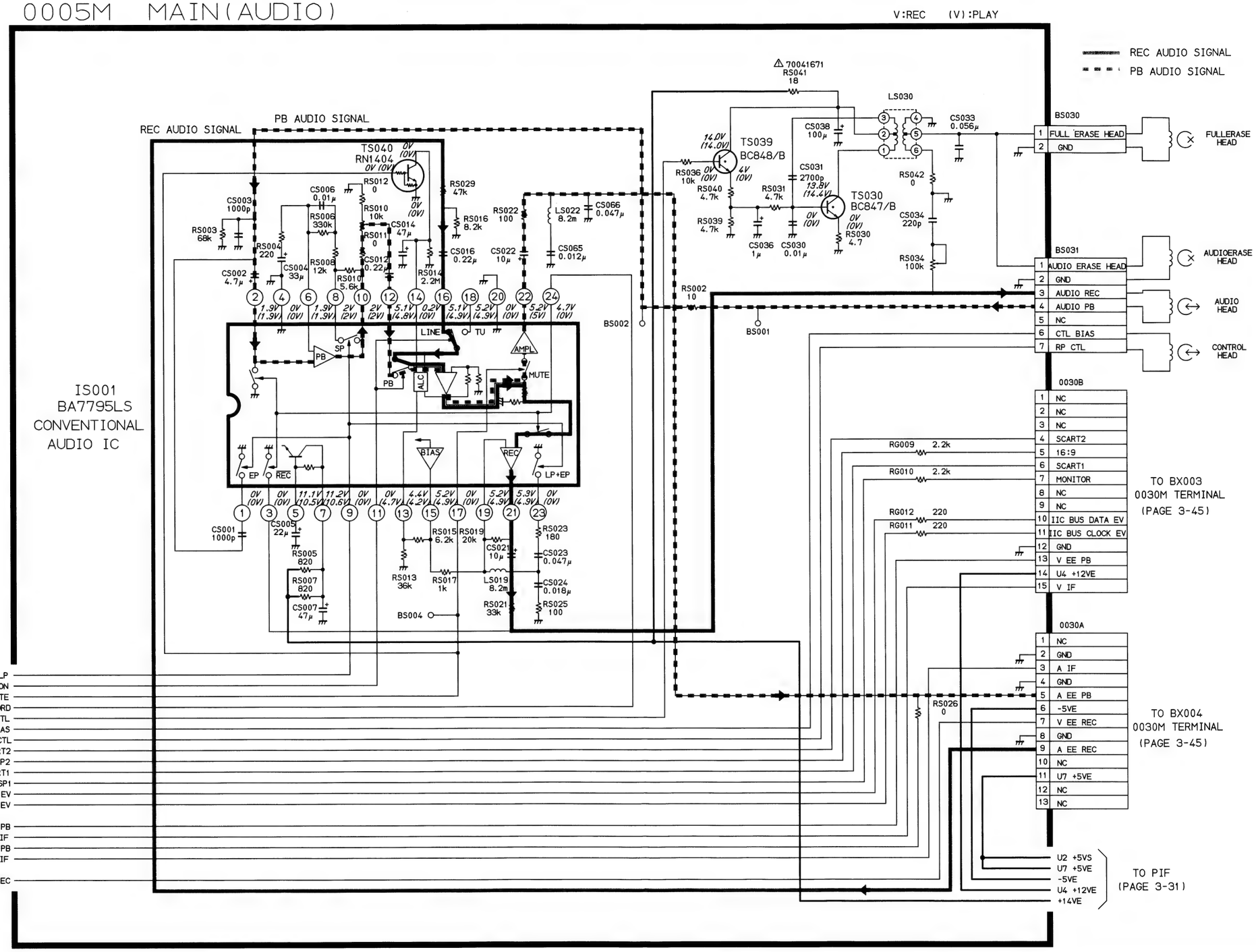
DAVIN
V:1V/div
H:5ms/div

A B C D E F G

8-9. Audio Circuit Diagram

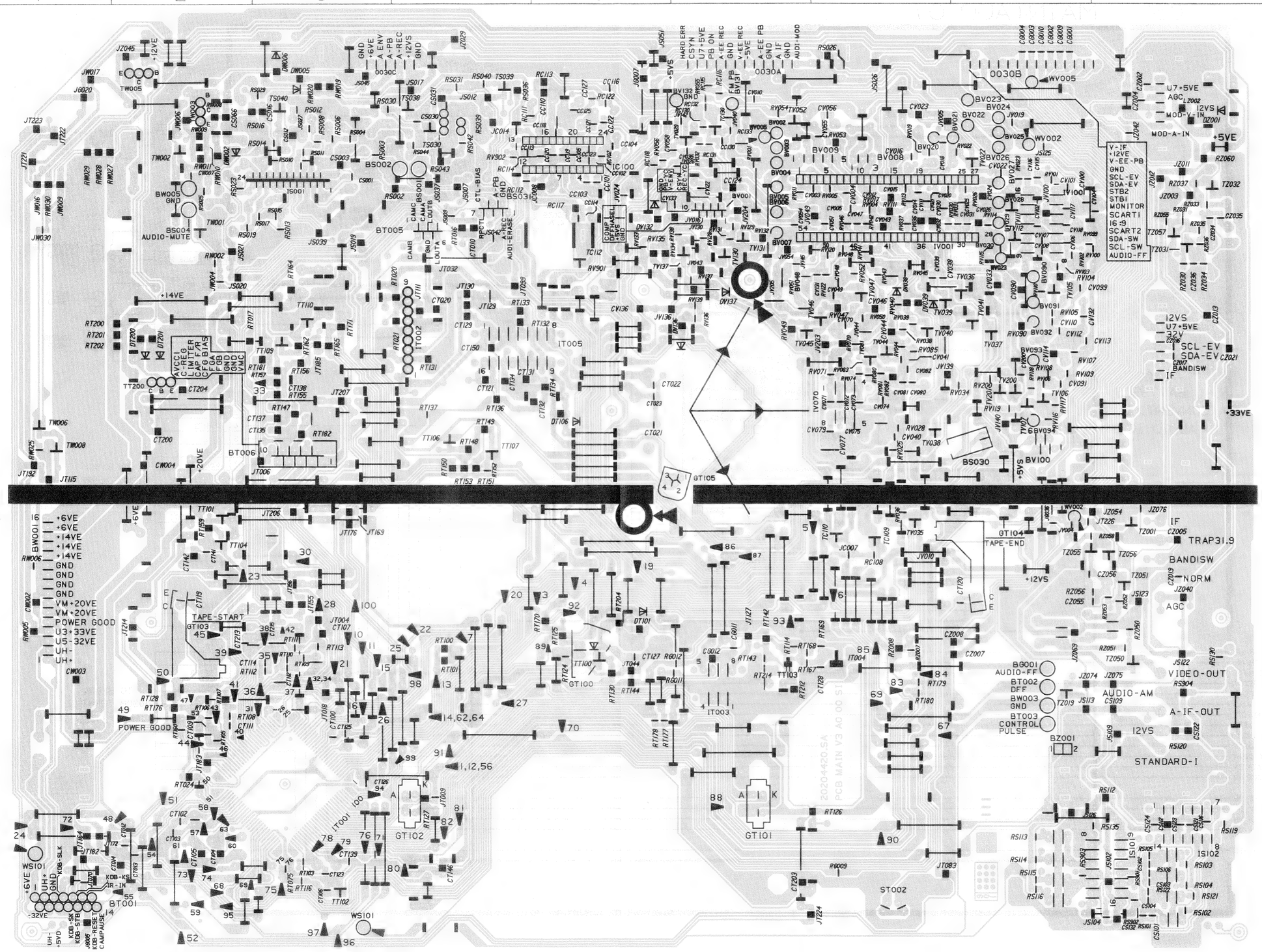


8-9. Audio Circuit Diagram



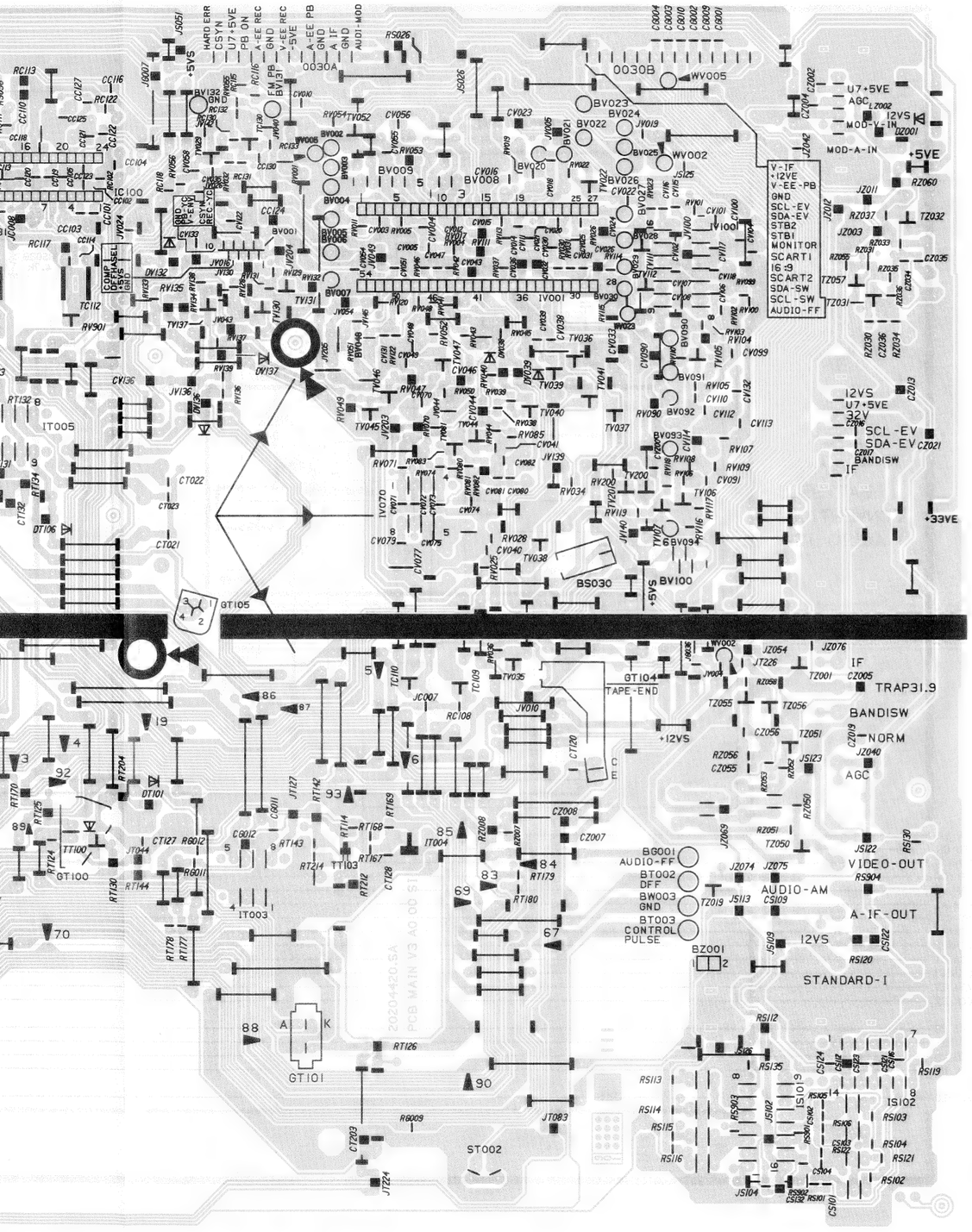
9. PC BOARDS

9-1. Main (PIF, Servo/Logic, Video, Audio) PC Board



SYMBOL NO.	LOCATION
DT200	C-2
DT201	C-2
DW002	B-2
DW005	A-3
DW006	A-3
DZ001	A-9
GT100	E-5
GT101	F-6
GT102	G-4
GT103	E-2
GT104	D-8
GT105	D-6
IS001	B-3
IT001	F-3
IT002	C-4
IT003	F-6
IT004	E-7
IT005	C-5
IV001	B-7
IV070	C-7
IV100	B-8
TS030	B-4
TS039	A-4
TS040	A-3
TT100	E-5
TT101	D-2
TT102	G-3
TT104	D-2
TT106	D-4
TT107	D-4
TT109	C-3
TT110	C-3
TT200	C-2
TV022	B-8
TV029	A-6
TV035	D-7
TV036	B-8
TV037	C-8
TV038	D-7
TV039	C-7
TV041	C-8
TV044	C-8
TV045	C-6
TV046	
TV047	
TV052	
TV105	
TV107	
TV111	
TV112	
TV130	
TV131	
TV137	
TW001	
TW002	
TW003	
TW005	
TW006	
TW008	
TZ032	
TZ050	
TZ051	
TZ055	
TZ056	
TZ057	

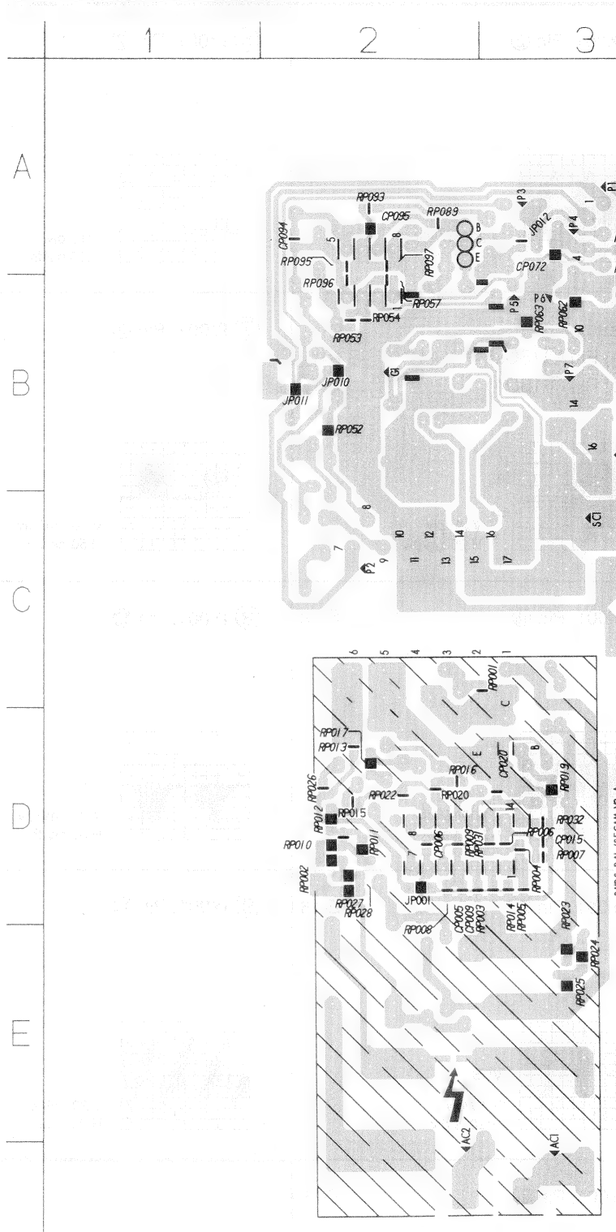
0005M Main (PIF, Servo/Logic, Video, Audio) PC Board



SYMBOL NO.	LOCATION
DT200	C-2
DT201	C-2
DW002	B-2
DW005	A-3
DW006	A-3
DZ001	A-9
GT100	E-5
GT101	F-6
GT102	G-4
GT103	E-2
GT104	D-8
GT105	D-6
IS001	B-3
IT001	F-3
IT002	C-4
IT003	F-6
IT004	E-7
IT005	C-5
IV001	B-7
IV070	C-7
IV100	B-8
TS030	B-4
TS039	A-4
TS040	A-3
TT100	E-5
TT101	D-2
TT102	G-3
TT104	D-2
TT106	D-4
TT107	D-4
TT109	C-3
TT110	C-3
TT200	C-2
TV022	B-8
TV029	A-6
TV035	D-7
TV036	B-8
TV037	C-8
TV038	D-7
TV039	C-7
TV041	C-8
TV044	C-8
TV045	C-6

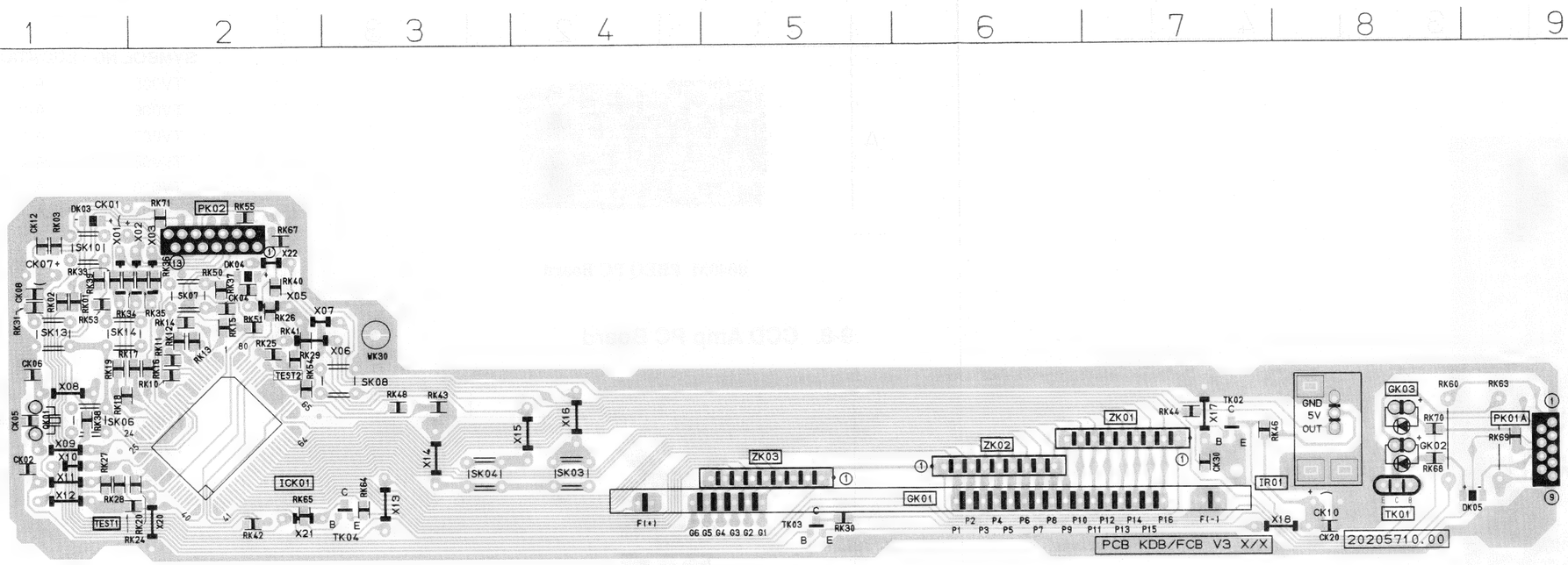
SYMBOL NO.	LOCATION
TV046	C-7
TV047	C-7
TV052	A-6
TV105	C-8
TV107	D-8
TV111	B-8
TV112	B-8
TV130	B-6
TV131	B-6
TV137	B-5
TW001	B-2
TW002	B-2
TW003	A-2
TW005	A-2
TW006	C-1
TW008	D-1
TZ032	B-9
TZ050	E-9
TZ051	E-9
TZ055	D-8
TZ056	E-9
TZ057	B-9

9-2. Power PC Board



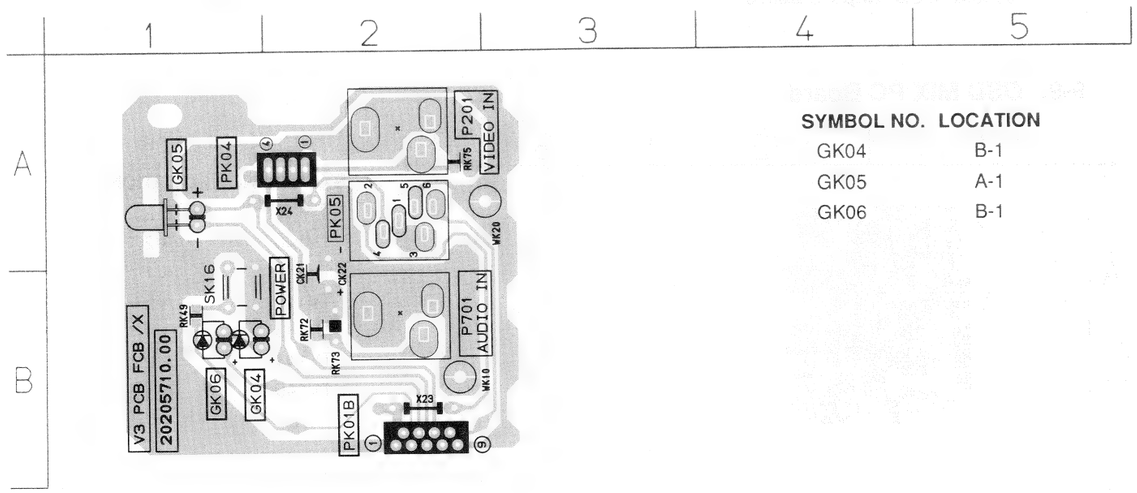
0150M Power PC Board

9-3. KDB PC Board



0210M KDB PC Board

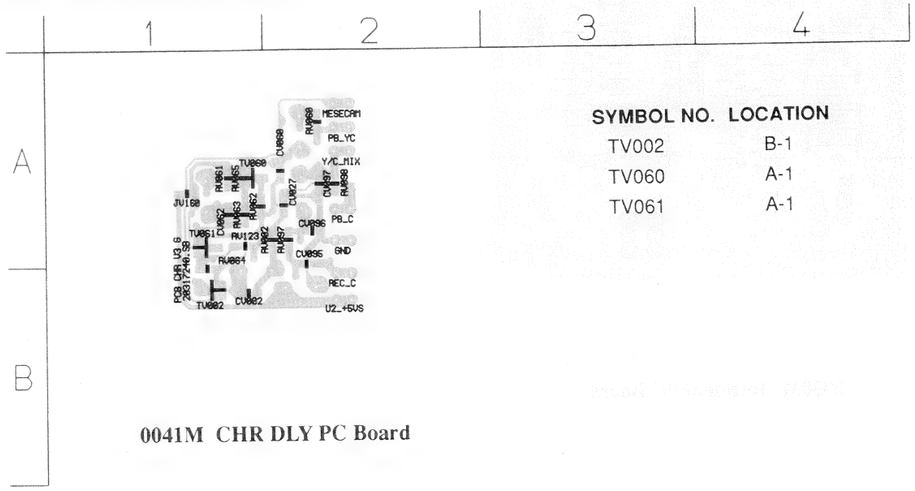
9-4. FCB PC Board



SYMBOL NO.	LOCATION
GK04	B-1
GK05	A-1
GK06	B-1

0212M FCB PC Board

9-5. CHR DLY PC Board

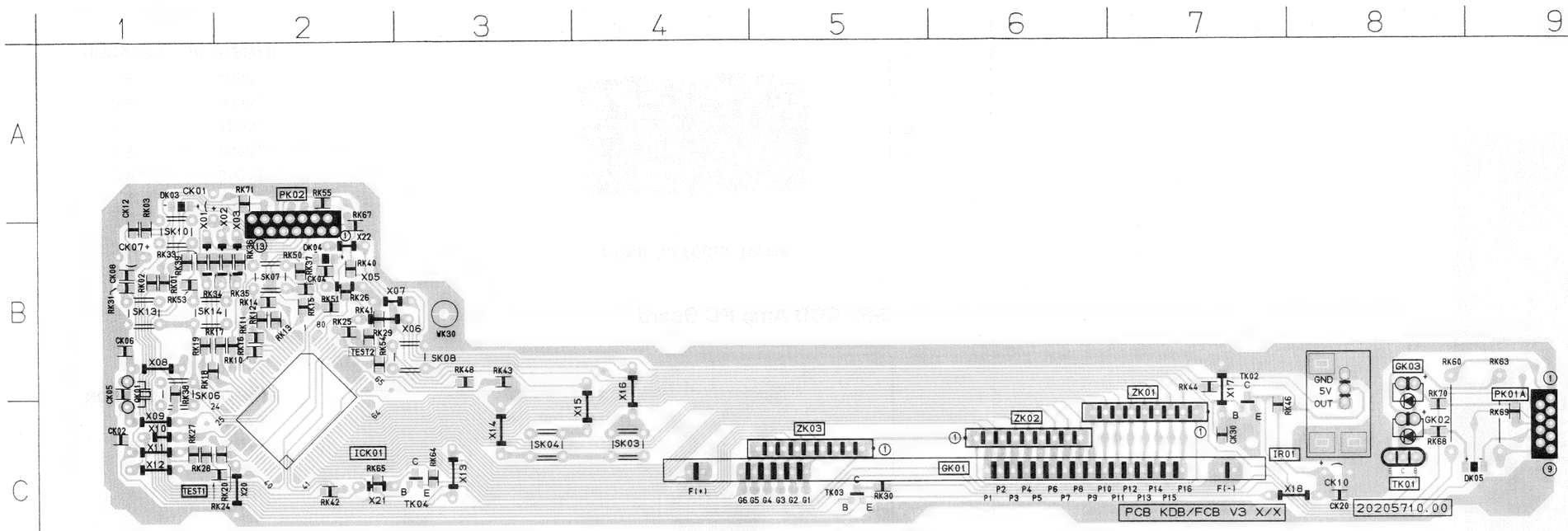


SYMBOL NO.	LOCATION
TV002	B-1
TV060	A-1
TV061	A-1

0041M CHR DLY PC Board

SYMBOL NO.	LOCATION
DK03	A-1
DK05	C-9
GK02	C-8
GK03	B-8
ICK01	C-2
IR01	C-7
TK01	C-8
TK02	B-7
TK03	C-5
TK04	C-3

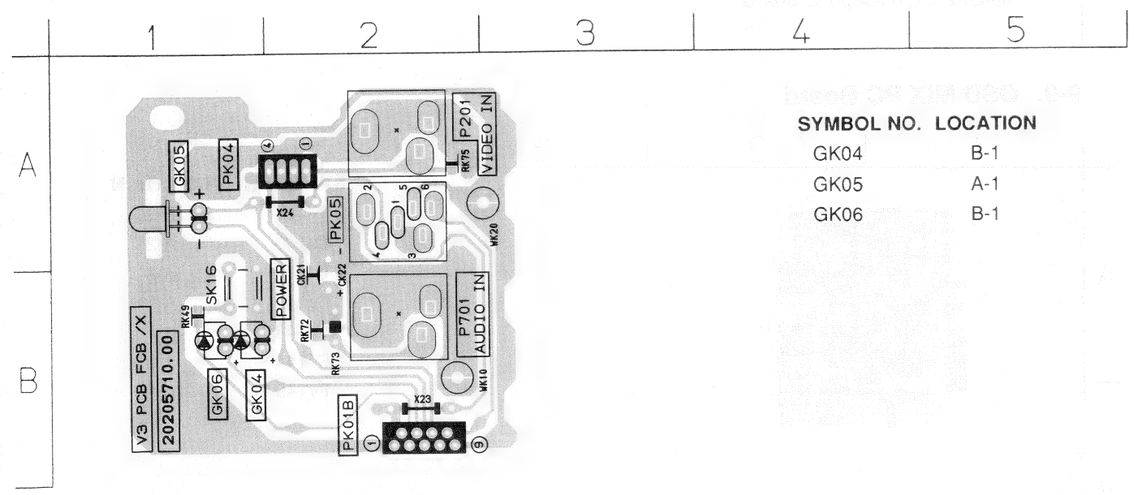
9-3. KDB PC Board



SYMBOL NO.	LOCATION
DK03	A-1
DK05	C-9
GK02	C-8
GK03	B-8
ICK01	C-2
IR01	C-7
TK01	C-8
TK02	B-7
TK03	C-5
TK04	C-3

0210M KDB PC Board

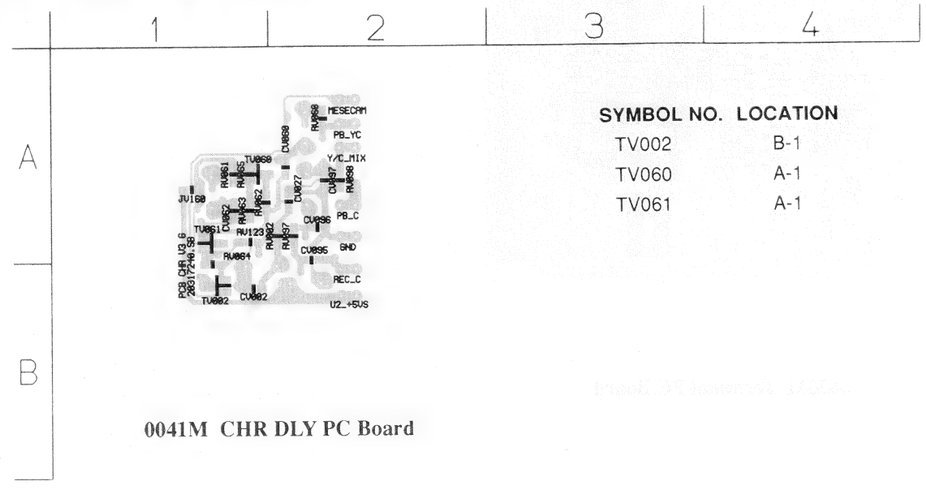
9-4. FCB PC Board



SYMBOL NO.	LOCATION
GK04	B-1
GK05	A-1
GK06	B-1

0212M FCB PC Board

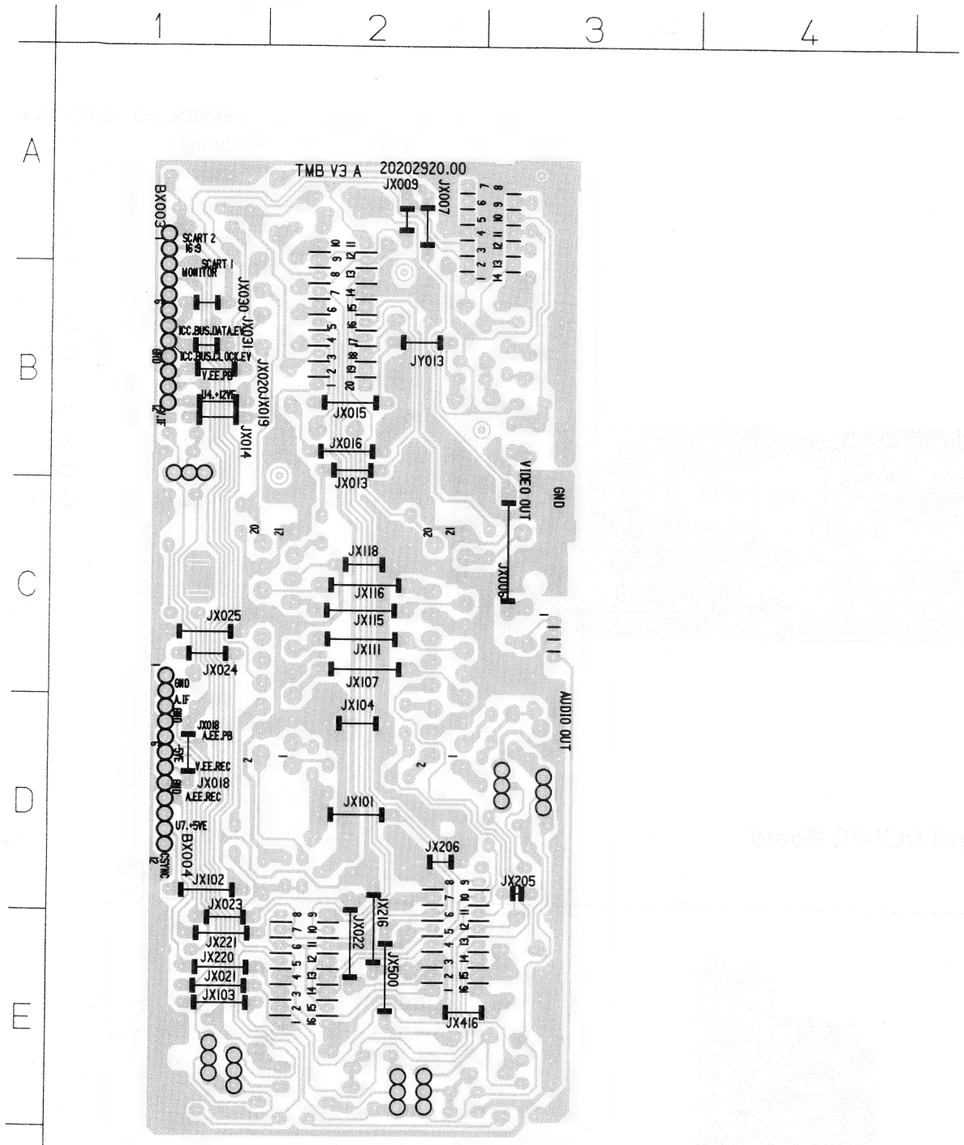
9-5. CHR DLY PC Board



SYMBOL NO.	LOCATION
TV002	B-1
TV060	A-1
TV061	A-1

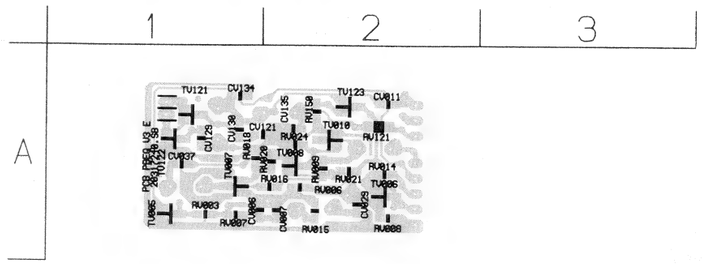
0041M CHR DLY PC Board

9-6. Terminal PC Board



0030M Terminal PC Board

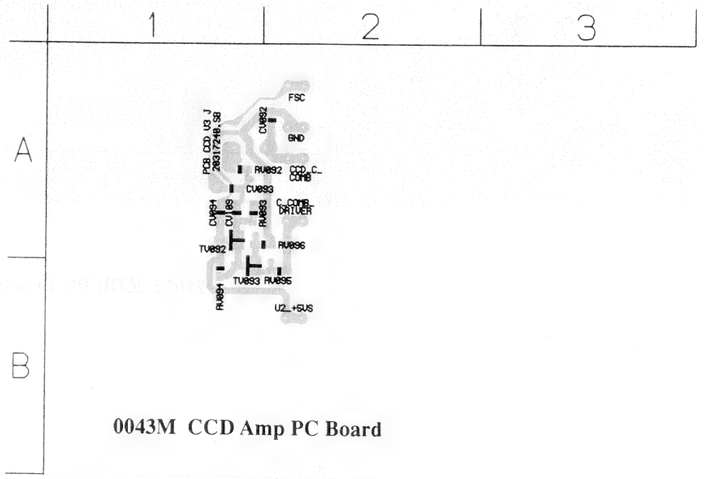
9-7. PB EQ PC Board



0040M PBEQ PC Board

SYMBOL NO.	LOCATION
TV005	A-1
TV006	A-2
TV007	A-1
TV008	A-2
TV010	A-2
TV121	A-1
TV122	A-1
TV123	A-2

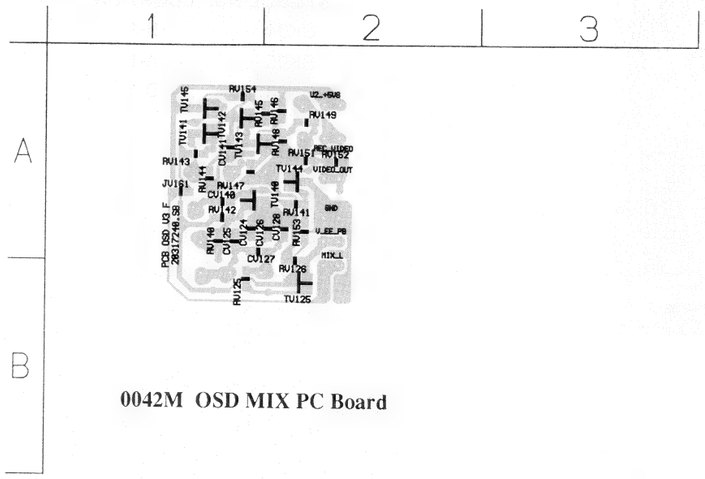
9-8. CCD Amp PC Board



0043M CCD Amp PC Board

SYMBOL NO.	LOCATION
TV092	A-1
TV093	B-1

9-9. OSD MIX PC Board



0042M OSD MIX PC Board

SYMBOL NO.	LOCATION
TV125	B-2
TV140	A-2
TV141	A-1
TV142	A-1
TV143	A-1
TV144	A-2
TV145	A-1

SECTION 4
PARTS LIST

SAFETY PRECAUTION

The parts identified by ⚠ mark are critical for safety. Replace only with part number specified.

The mounting position of replacement is to be identical with originals.

The substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

NOTICE

The part number must be used when ordering parts in order to assist in processing, be sure to include the model number and description.

Parts marked # are of chip type and mounted on original PC boards.

However, when they are placed for servicing works, use discrete parts listed on the parts list.

ABBREVIATIONS

1. **Integrated circuit (IC)**
2. **Capacitor (Cap)**
   - **Capacitance Tolerance (for Nominal Capacitance more than 10pF)**

Symbol	B	C	D	F	G	J	K	M	N
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20	± 30

Symbol	P	Q	T	U	V	W	X	Y	Z
Tolerance %	+ 100 0	+ 30 −10	+ 50 −10	+ 75 −10	+ 20 −10	+ 100 −10	+ 40 −20	+ 150 −10	+ 80 −20

Ex. 10μF J = 10μF ± 5%

   - **Capacitance Tolerance (for Nominal Capacitance 10pF or less)**

Symbol	B	C	D	F	G
Tolerance pF	± 0.1	± 0.25	± 0.5	± 1	± 2

Ex. 10pF G = 10pF ± 2pF

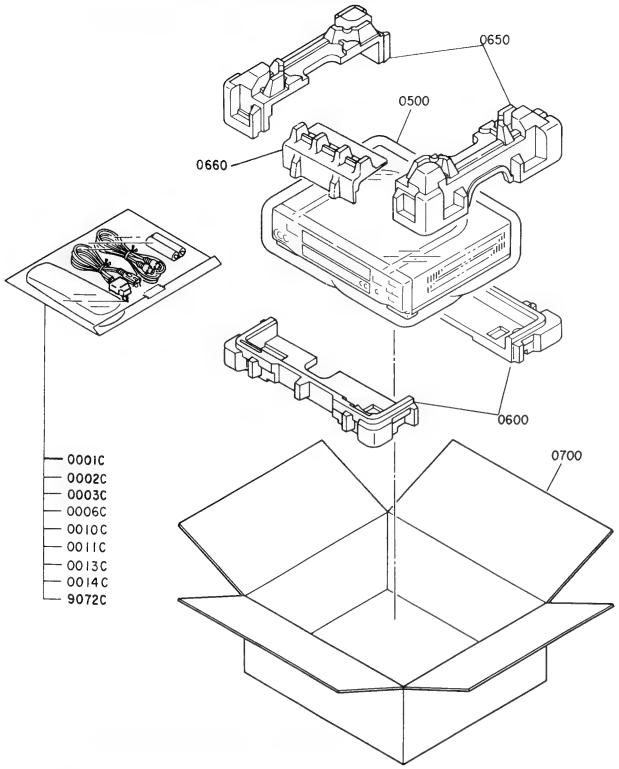
3. **Resistor (Res)**
   - **Resistance tolerance**

Symbol	B	C	D	F	G	J	K	M
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20

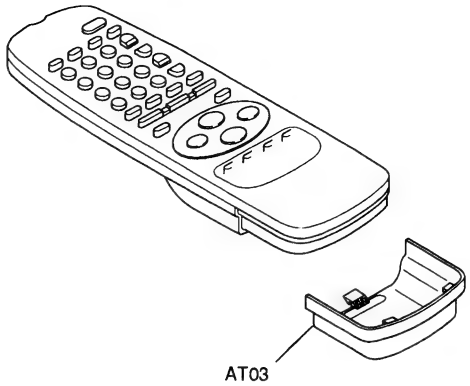
Ex. 470 Ω J = 470Ω ± 5%

4. EXPLODED VIEWS

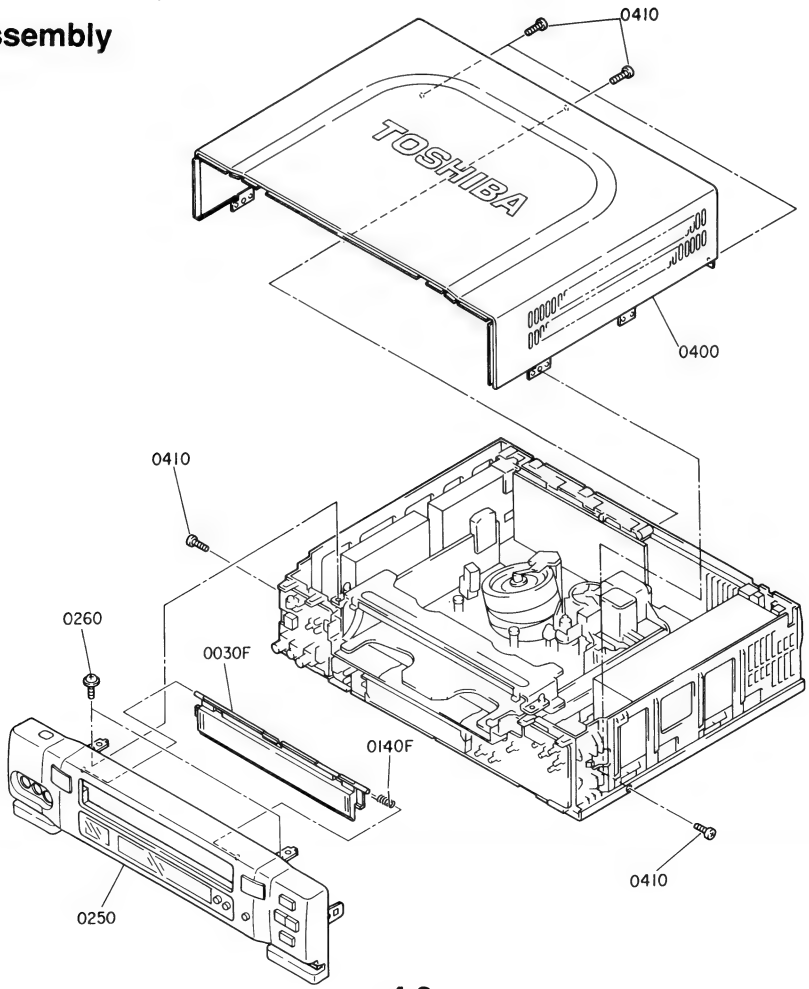
4-1. Packing Assembly



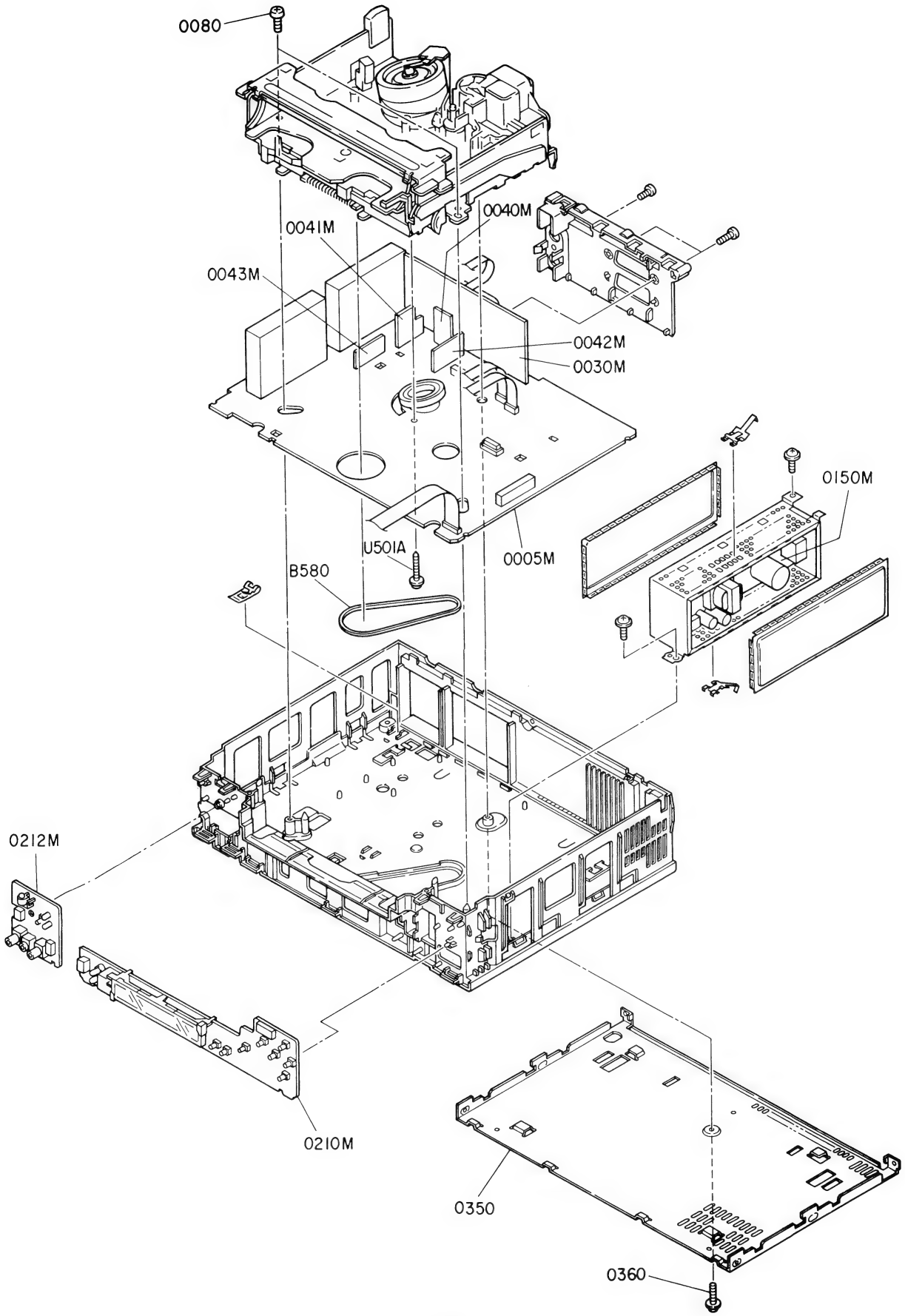
4-2. Remote Control Unit



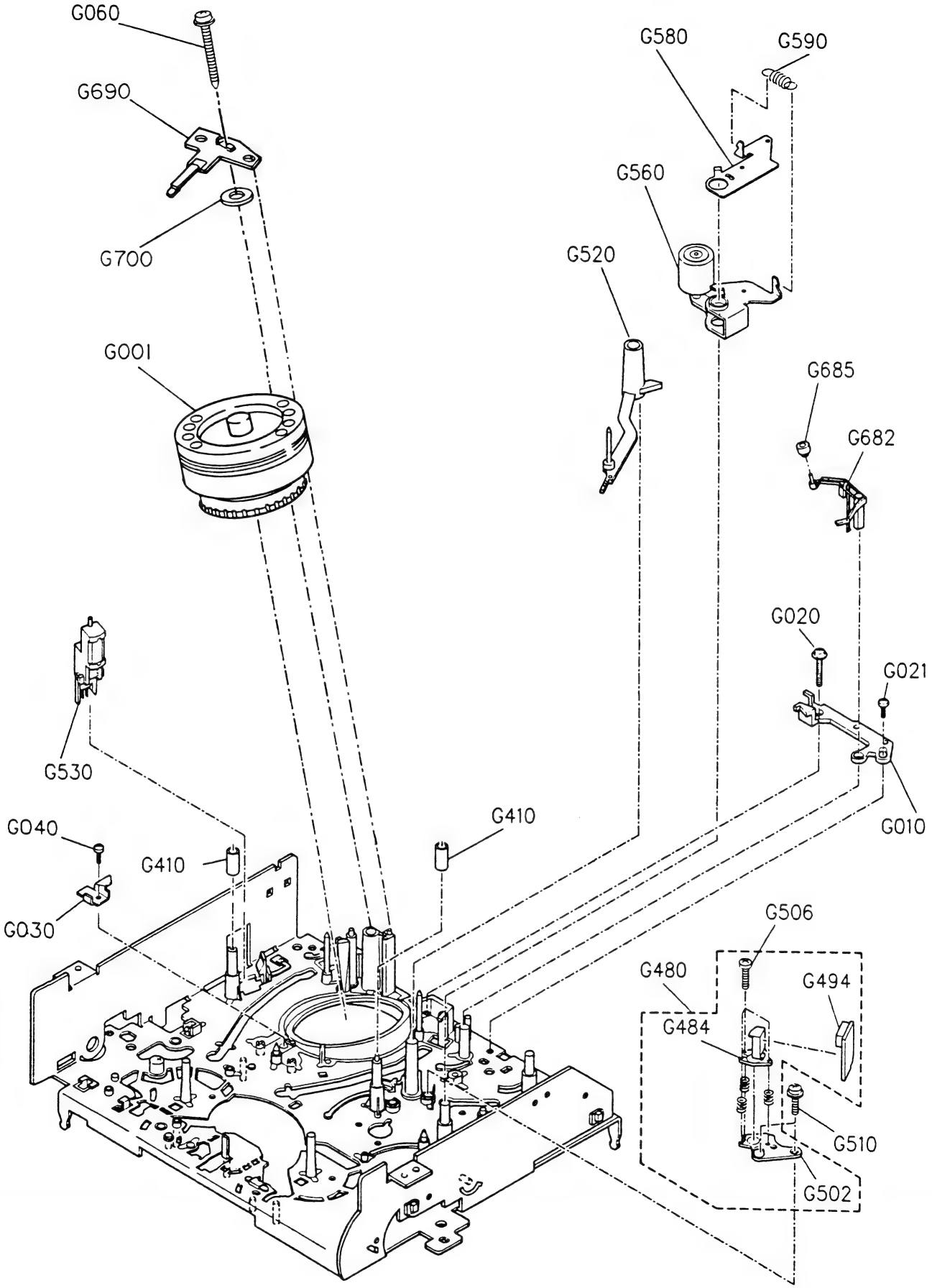
4-3. Cabinet Assembly



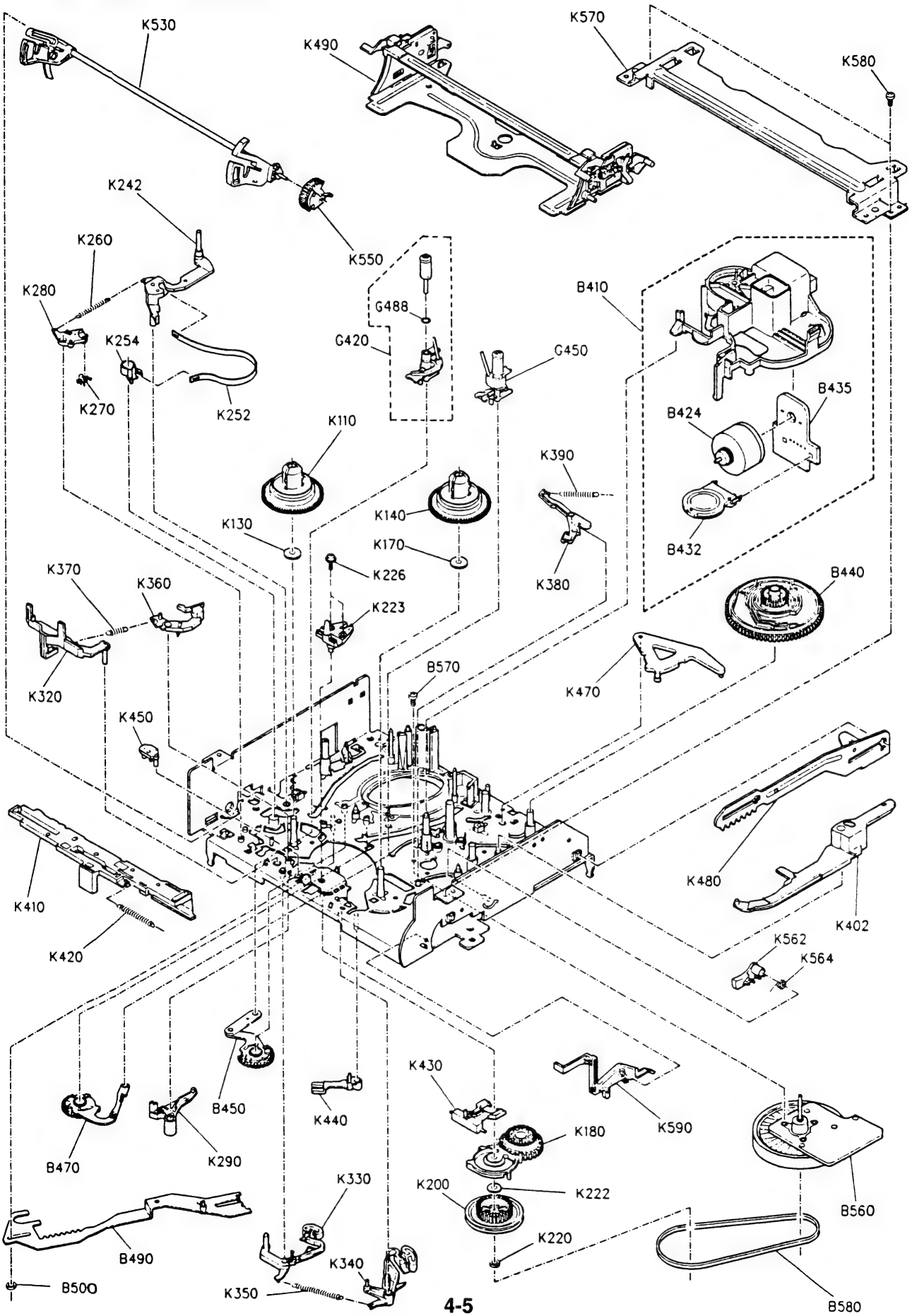
4-4. Chassis Assembly



4-5. Mechanism Assembly (1)



4-6. Mechanism Assembly (2)



5. PARTS LIST

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
		- MECHANICAL PARTS -	
0001C	70060925	Owners Manual	German
0002C	70061115	Owners Manual	English/Spanish
0003C	70061116	Owners Manual	Russian
0006C	70060040	Cover	
0010C	70011758	Remote Control Unit	
0013C	70011442	Cable	
⚠0014C	70010354	Mains Cord	
0030F	70051379	Cassette Door	
⚠0250	70051373	Front Panel	
0260	72471082	Screw, 3x10mm	
⚠0400	70051135	Top Cover	
0500	70060991	Cover	
0600	70060989	Packing(Bottom)	
0650	70060990	Packing(Top)	
0660	70061173	Packing(Front)	
9072C	70061050	Quick Reference	German
AT03	70107025	Case, Battery	
B218	70031325	Center Holding Post	
B410	70031394	Loading Drive Assy	
B424	70031396	Loading Motor Sub Assy	
B432	70031401	Cam Switch	
B435	70031402	Loading Drive Unit	
B440	70051147	Cam Gear	
B450	70031404	S Loading Assy	
B470	70031408	T Loading Assy	
B490	70031412	Loading Slider Assy	
B560	70031498	Capstan Motor Assy	
B570	70070028	Screw	2.6x6mm
B580	70031442	Reel Belt	
G001	70031566	Cylinder Assy	
G010	70031444	Plate(Cylinder)	
G020	70031603	Screw	2.6x4mm
G021	70031488	Screw	2.6x0.4x5mm
G030	70031445	Plate(Cylinder)	
G040	70031488	Screw	2.6x0.4x5mm
G060	70031449	Screw	
G410	70031348	Guide Sleeve	
G420	70031349	S Slider Assy	
G448	70031505	O Ring	
G450	70031360	T Slider Assy	
G480	70031365	ACE Head Assy	
G484	70031367	ACE Head Sub Assy	
G504	70031508	Spring	
G520	70031370	No.9 Guide Lever Assy	
G530	70031443	FE Head	
G560	70031384	Pinch Lever Assy	
G580	70031390	Pinch Drive Assy	
G590	70031392	Spring	
G680	70031493	Cleaner Lever Assy	
G690	70031540	Ground Brush	
K110	70031328	S Reel Assy	
K130	70031334	Washer	
K140	70031335	T Reel Assy	
K170	70031334	Washer	
K180	70031339	Idle Arm Assy	
K200	70031345	Center Gear Pully	
K220	70031503	Washer	
K222	70031527	Washer	
K242	70031374	Tension Lever Sub Assy	
K252	70031376	Band Brake Sub Assy	
K254	70031377	Band Holder	
K260	70031378	Spring	
K270	70031379	Hook Lever	
K280	70031380	Hook Lever	
K290	70031381	Tension Drive Lever	
K320	70031466	Rec Inhibit Lever	
K330	70031420	S Main Brake Assy	
K340	70031421	T Main Brake Assy	
K350	70031422	Spring	
K360	70031469	S Soft Brake Lever	
K370	70031423	Spring	
K380	70031424	T Soft Brake Assy	

LOCATION NUMBER	PART NUMBER	DESCRIPTION
K390	70031426	Spring
K402	70031471	Drive Lever
K410	70031427	Cam Slider
K420	70031428	Spring
K430	70031472	Idle Up Down Lever
K440	70031473	Idle Kick Lever
K450	70031476	Idle Centering Lever
K470	70031477	Cam Lever
K480	70031430	FL Drive Slider
K490	70031431	Cassette Holder Assy
K530	70031415	Drive Arm Assy
K550	70051150	Drive Lever Gear
K562	70031482	Arm Brake Lever
K564	70031440	Spring
K570	70031441	Top Bracket
K590	70031483	Door Open Lever
U501A	70070069	Screw

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
		- ELECTRICAL PARTS -	
■0005M	70090603	P C Board Assy	Main
		- INTEGRATED CIRCUITS -	
IS001	70011973	IC	BA7795LS
IT001	70011812	IC	TMP90PR74DF
IT002	70011888	IC	TA7291S
IT003	70011892	IC	ST24C04
IT004	70011808	IC	PST7032MT
IT005	70011887	IC	TB6515AP
IV001	70011884	IC	TA8892N
IV070	70011890	IC	TA8844P
IV100	70011891	IC	TL8843P
		- TRANSISTORS -	
TC112	70010947	Transistor	BC858
TS030	70010331	Transistor	BC847B
TS038	A6004040	Transistor, Chip	RN1404
TS039	70010150	Transistor	BC848B
TS040	A6004040	Transistor, Chip	RN1404
TT100	70010150	Transistor	BC848B
TT101	70010942	Transistor	BC848
TT102	70010947	Transistor	BC858
TT104	70010942	Transistor	BC848
TT106	A6004040	Transistor, Chip	RN1404
TT107	A6004040	Transistor, Chip	RN1404
TT109	A6004020	Transistor, Chip	RN1402
TT110	70010332	Transistor	BC857B
TT111	70011386	Transistor	2SA1020-Y
TT200	70010131	Transistor	BC337-40
TV022	70010150	Transistor	BC848B
TV029	70010150	Transistor	BC848B
TV035	A6004020	Transistor, Chip	RN1402
TV036	A6004020	Transistor, Chip	RN1402
TV037	A6004020	Transistor, Chip	RN1402
TV038	A6004020	Transistor, Chip	RN1402
TV039	A6004020	Transistor, Chip	RN1402
TV041	A6004020	Transistor, Chip	RN1402
TV044	70011963	Transistor, Chip	BC848/A
TV045	A6004020	Transistor, Chip	RN1402
TV046	A6004020	Transistor, Chip	RN1402
TV047	70010947	Transistor	BC858
TV052	70010947	Transistor	BC858
TV105	70010150	Transistor	BC848B
TV106	70010150	Transistor	BC848B
TV107	70011963	Transistor, Chip	BC848/A
TV111	70010150	Transistor	BC848B
TV112	70010150	Transistor	BC848B
TV130	70010942	Transistor	BC848
TV131	70010947	Transistor	BC858
TV137	A6004020	Transistor, Chip	RN1402
TW001	70010942	Transistor	BC848
TW002	A6014030	Transistor, Chip	RN2403
TW003	A6325549	Transistor	2SC2236-Y
TW005	A6325549	Transistor	2SC2236-Y
TW006	70010947	Transistor	BC858
TW008	A6004050	Transistor, Chip	RN1405
TZ001	A6004020	Transistor, Chip	RN1402
TZ032	70010947	Transistor	BC858
TZ050	70010150	Transistor	BC848B
TZ051	70010947	Transistor	BC858
TZ055	A6004020	Transistor, Chip	RN1402
TZ056	A6004020	Transistor, Chip	RN1402
TZ057	70010947	Transistor	BC858
		- DIODES -	
DT102	70010453	Diode	1N4001
DT103	70010453	Diode	1N4001
DT104	70010453	Diode	1N4001
DT107	70010453	Diode	1N4001
DT108	70010453	Diode	1N4001
DT200	70011970	Diode, Zener	ZMM4.7
DT201	70010965	Diode	LL4448
DT202	70010453	Diode	1N4001
DT203	70010453	Diode	1N4001
DT204	70010153	Diode	1N4148
DT205	70010153	Diode	1N4148
DW001	70011967	Diode, Zener	ZPD12
DW002	70010965	Diode	LL4448
DW005	70011968	Diode, Zener	ZMM5.1
DW006	70010965	Diode	LL4448
DW007	70010453	Diode	1N4001
DW008	70010453	Diode	1N4001
DZ001	70011968	Diode, Zener	ZMM5.1
GT100	70010180	Diode	
		- COILS -	
LS019	23237729	Coil, Peaking	TRF4822AP
LS022	23237729	Coil, Peaking	TRF4822AP
LS030	70011369	Transformer	
LT103	70011953	Coil, Peaking	
LT105	70010920	Coil, Peaking	
LT106	70011953	Coil, Peaking	
LV009	23289181	Coil, Peaking	TRF4181AF
LV012	70010920	Coil, Peaking	
LV047	70012098	Coil, Peaking	
LV084	23237981	Coil, Peaking	TRF4330AC
LV103	23237981	Coil, Peaking	TRF4330AC
LV104	70011541	Coil, Peaking	
LV105	70011576	Coil, Peaking	
LZ003	23237983	Coil, Peaking	TRF4220AC
LZ051	70010924	Coil, Peaking	
LZ055	70011772	Coil, Peaking	
		- CAPACITORS -	
CG011	70041873	Cap, Chip	100pF K
CG012	70041868	Cap, Chip	100pF K 50V
CS001	24815152	Cap, Chip	1500pF K 50V
CS002	70040738	Cap, Electrolytic	4.7μF 25V
CS003	70041155	Cap, Chip	1.5nF J 50V
CS004	70041869	Cap, Electrolytic	6.8μF M 16V
CS005	24633220	Cap, Electrolytic	22μF M 16V
CS006	24591103	Cap, Plastic	0.01μF J 50V
CS007	70040415	Cap, Electrolytic	47μF M 16V
CS012	70041009	Cap, Chip	220nF Z 50V
CS014	70040415	Cap, Electrolytic	47μF M 16V
CS016	70041009	Cap, Chip	220nF Z 50V
CS021	24797100	Cap, Electrolytic	10μF M 50V
CS022	24797100	Cap, Electrolytic	10μF M 50V
CS023	24591473	Cap, Plastic	0.047μF J 50V
CS024	70011538	Cap, Plastic	22nF J 50V
CS030	70041596	Cap, Chip	10nF K 50V
CS031	70041490	Cap, Chip	2.7nF M 50V
CS033	70040053	Cap, Plastic	56nF J 63V
CS034	24214221	Cap, Ceramic	220pF K 500V
CS036	24636010	Cap, Electrolytic	1μF M 50V
CS038	70040530	Cap, Electrolytic	100μF M 16V
CS065	70041411	Cap, Plastic	12nF J 63V
CS066	70041625	Cap, Chip	47nF M 25V
CS119	70040738	Cap, Electrolytic	4.7μF 25V
CT010	24285222	Cap, Chip	2200pF K 50V
CT011	70041037	Cap, Electrolytic	47μF M 16V
CT012	70041001	Cap, Chip	220pF J 50V
CT013	70041001	Cap, Chip	220pF J 50V
CT014	70041629	Cap, Chip	1nF M 50V
CT020	70040730	Cap, Chip	100nF M 25V
CT021	70041596	Cap, Chip	10nF K 50V
CT022	70041596	Cap, Chip	10nF K 50V
CT023	70041596	Cap, Chip	10nF K 50V
CT100	24092293	Cap, Chip	0.1μF Z 25V
CT102	24774470	Cap, Chip	47pF J 50V
CT103	24774470	Cap, Chip	47pF J 50V
CT104	70041011	Cap, Chip	10pF J 50V
CT108	70041037	Cap, Electrolytic	47μF M 16V
CT109	24774101	Cap, Chip	100pF J 50V
CT110	70041037	Cap, Electrolytic	47μF M 16V
CT111	24774101	Cap, Chip	100pF J 50V
CT112	24774151	Cap, Chip	150pF J 50V
CT116	70041054	Cap, Electrolytic	1μF M 50V
CT117	70041054	Cap, Electrolytic	1μF M 50V
CT119	70040247	Cap, Ceramic, Chip	1nF J 50V
CT120	70040247	Cap, Ceramic, Chip	1nF J 50V
CT121	70041626	Cap, Chip	100nF M 25V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CT123	24774100	Cap, Chip	10pF	D 50V
CT125	24092293	Cap, Chip	0.1μF	Z 25V
CT126	24092293	Cap, Chip	0.1μF	Z 25V
CT128	70041596	Cap, Chip	10nF	K 50V
CT129	70040730	Cap, Chip	100nF	M 25V
CT131	70040730	Cap, Chip	100nF	M 25V
CT132	70040730	Cap, Chip	100nF	M 25V
CT133	70041713	Cap, Electrolytic	100μF	M 16V
CT134	70040730	Cap, Chip	100nF	M 25V
CT135	70040989	Cap, Chip	10nF	K 50V
CT137	24285102	Cap, Chip	1000pF	K 50V
CT138	24285102	Cap, Chip	1000pF	K 50V
CT139	24774100	Cap, Chip	10pF	D 50V
CT141	24092293	Cap, Chip	0.1μF	Z 25V
CT142	70040730	Cap, Chip	100nF	M 25V
CT145	70041111	Cap, Electrolytic	470μF	M 10V
CT146	70041023	Cap, Chip	22nF	M 50V
CT200	70040730	Cap, Chip	100nF	M 25V
CT201	24203470	Cap, Electrolytic	47μF	M 16V
CT202	70040412	Cap, Electrolytic	220μF	M 10V
CT203	70040730	Cap, Chip	100nF	M 25V
CT204	70040730	Cap, Chip	100nF	M 25V
CT213	24092178	Cap, Chip	0.1μF	K 25V
CT215	24092178	Cap, Chip	0.1μF	K 25V
CV001	70041522	Cap, Electrolytic	47μF	M 10V
CV005	70041001	Cap, Chip	220pF	J 50V
CV012	24092178	Cap, Chip	0.1μF	K 25V
CV013	24797330	Cap, Electrolytic	33μF	M 50V
CV014	70041704	Cap, Chip	47nF	K 10V
CV015	70041654	Cap, Chip	10nF	K 25V
CV016	70041654	Cap, Chip	10nF	K 25V
CV017	24636010	Cap, Electrolytic	1μF	M 50V
CV020	24774150	Cap, Chip	15pF	J 50V
CV021	70041655	Cap, Chip	15nF	K 50V
CV022	24774330	Cap, Chip	33pF	J 50V
CV023	70041699	Cap, Chip	100nF	K
CV024	70041624	Cap, Chip	470nF	Z
CV025	24815102	Cap, Chip	1000pF	K 50V
CV026	70041699	Cap, Chip	100nF	K
CV030	24092178	Cap, Chip	0.1μF	K 25V
CV031	70041655	Cap, Chip	15nF	K 50V
CV032	70041623	Cap, Chip	330nF	K
CV033	24285103	Cap, Chip	0.01μF	K 50V
CV035	24092178	Cap, Chip	0.1μF	K 25V
CV036	70041623	Cap, Chip	330nF	K
CV038	70041530	Cap, Chip	330nF	Z 16V
CV039	70041530	Cap, Chip	330nF	Z 16V
CV041	24092178	Cap, Chip	0.1μF	K 25V
CV043	70041623	Cap, Chip	330nF	K
CV044	70041624	Cap, Chip	470nF	Z
CV045	70041505	Cap, Electrolytic	3.3μF	M 50V
CV046	70041567	Cap, Chip	680nF	Z 16V
CV047	70041654	Cap, Chip	10nF	K 25V
CV048	24774180	Cap, Chip	18pF	J 50V
CV049	24774470	Cap, Chip	47pF	J 50V
CV050	70041641	Cap, Electrolytic	10μF	M 50V
CV051	70041654	Cap, Chip	10nF	K 25V
CV052	70041639	Cap, Electrolytic	4.7μF	M 16V
CV053	70041645	Cap, Electrolytic	10μF	M 35V
CV054	24092178	Cap, Chip	0.1μF	K 25V
CV055	24774180	Cap, Chip	18pF	J 50V
CV056	70041857	Cap, Chip	300pF	J 50V
CV057	70041522	Cap, Electrolytic	47μF	M 10V
CV058	70041631	Cap, Chip	22nF	K 50V
CV070	24092178	Cap, Chip	0.1μF	K 25V
CV071	24774820	Cap, Chip	82pF	J 50V
CV072	24092178	Cap, Chip	0.1μF	K 25V
CV073	24092178	Cap, Chip	0.1μF	K 25V
CV074	70041856	Cap, Chip	220nF	Z
CV075	24092178	Cap, Chip	0.1μF	K 25V
CV076	70041522	Cap, Electrolytic	47μF	M 10V
CV079	24092178	Cap, Chip	0.1μF	K 25V
CV080	24872222	Res, Chip	2.2kΩ	J 1/16W
CV082	24774100	Cap, Chip	10pF	D 50V
CV091	24092178	Cap, Chip	0.1μF	K 25V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CV099	24092178	Cap, Chip	0.1μF	K 25V
CV100	24815472	Cap, Chip	4700pF	K 50V
CV101	70041654	Cap, Chip	10nF	K 25V
CV102	24092178	Cap, Chip	0.1μF	K 25V
CV103	70041241	Cap, Electrolytic	47μF	M 16V
CV106	24774560	Cap, Chip	56pF	J 50V
CV107	24092178	Cap, Chip	0.1μF	K 25V
CV108	70041529	Cap, Chip	1μF	Z 16V
CV110	24774220	Cap, Chip	22pF	J 50V
CV111	70041654	Cap, Chip	10nF	K 25V
CV112	70041650	Cap, Chip	8pF	D
CV113	24774270	Cap, Chip	27pF	J 50V
CV114	24285103	Cap, Chip	0.01μF	K 50V
CV115	70041654	Cap, Chip	10nF	K 25V
CV116	70041654	Cap, Chip	10nF	K 25V
CV117	24092178	Cap, Chip	0.1μF	K 25V
CV118	24092178	Cap, Chip	0.1μF	K 25V
CV122	70041657	Cap, Chip	22nF	K 25V
CV131	70041654	Cap, Chip	10nF	K 25V
CV133	70040261	Cap, Ceramic, Chip	68pF	J 50V
CV136	70041631	Cap, Chip	22nF	K 50V
CW001	70040530	Cap, Electrolytic	100μF	M 16V
CW005	24797100	Cap, Electrolytic	10μF	M 50V
CW006	70040738	Cap, Electrolytic	4.7μF	25V
CW007	70041533	Cap, Chip	47nF	K 50V
CZ002	70041141	Cap, Chip	22nF	M 25V
CZ003	70041500	Cap, Electrolytic	47μF	M 50V
CZ004	70041141	Cap, Chip	22nF	M 25V
CZ005	70040980	Cap, Chip	100pF	J 50V
CZ007	70040980	Cap, Chip	100pF	J 50V
CZ008	70040980	Cap, Chip	100pF	J 50V
CZ013	70041125	Cap, Chip	22nF	M 25V
CZ014	70041241	Cap, Electrolytic	47μF	M 16V
CZ015	70041500	Cap, Electrolytic	47μF	M 50V
CZ021	70041125	Cap, Chip	22nF	M 25V
CZ030	70040530	Cap, Electrolytic	100μF	M 16V
CZ033	70040530	Cap, Electrolytic	100μF	M 16V
CZ055	70041652	Cap, Chip	910pF	J 50V
CZ056	70040246	Cap, Ceramic, Chip	270pF	J 50V
PT101	24093962	Cap, Variable	20pF	
		- RESISTORS -		
RC112	70041096	Chip Jumper		
RC116	70041096	Chip Jumper		
RC118	24872102	Res, Chip	1kΩ	J 1/16W
RG009	24872222	Res, Chip	2.2kΩ	J 1/16W
RG010	70041068	Res, Carbon	2.2kΩ	J
RG011	70041096	Chip Jumper		
RG012	24872391	Res, Chip	390Ω	J 1/16W
RS002	24871100	Res, Chip	10Ω	J 1/8W
RS003	24872333	Res, Chip	33kΩ	J 1/16W
RS004	24872221	Res, Chip	220Ω	J 1/16W
RS005	70040895	Res, Carbon	820Ω	J 1/4W
RS006	24872334	Res, Chip	330kΩ	J 1/16W
RS007	70040895	Res, Carbon	820Ω	J 1/4W
RS008	24872123	Res, Chip	12kΩ	J 1/16W
RS010	24872562	Res, Chip	5.6kΩ	J 1/16W
RS011	24872432	Res, Chip	4.3kΩ	J 1/16W
RS012	24872822	Res, Chip	8.2kΩ	J 1/16W
RS013	24872393	Res, Chip	39kΩ	J 1/16W
RS014	70041676	Res, Chip	2.2MΩ	K 1/10W
RS015	24872682	Res, Chip	6.8kΩ	J 1/16W
RS016	24871822	Res, Chip	8.2kΩ	J 1/8W
RS017	24872102	Res, Chip	1kΩ	J 1/16W
RS019	24872203	Res, Chip	20kΩ	J 1/16W
RS021	70040786	Res, Carbon	33kΩ	J 1/4W
RS022	70040701	Res, Carbon	100Ω	J 1/4W
RS023	24872331	Res, Chip	330Ω	J 1/16W
RS025	24872101	Res, Chip	100Ω	J 1/16W
RS026	70041093	Chip Jumper		
RS029	24872473	Res, Chip	47kΩ	J 1/16W
RS030	70041176	Res, Chip	4.7Ω	J 1/16W
RS031	24872472	Res, Chip	4.7kΩ	J 1/16W
RS036	24871103	Res, Chip	10kΩ	J 1/8W
RS039	24871472	Res, Chip	4.7kΩ	J 1/8W
RS040	24872472	Res, Chip	4.7kΩ	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
⚠RS041	70041671	Res, Fusible	18Ω	J 0.3W
RS042	70041096	Chip Jumper		
RS130	24872104	Res, Chip	100kΩ	J 1/16W
RS901	70041096	Chip Jumper		
RS902	70041096	Chip Jumper		
RS903	70041096	Chip Jumper		
RS904	70041093	Chip Jumper		
RT016	24871472	Res, Chip	4.7kΩ	J 1/8W
RT017	24871821	Res, Chip	820Ω	J 1/8W
RT024	24871103	Res, Chip	10kΩ	J 1/8W
RT075	24872222	Res, Chip	2.2kΩ	J 1/16W
RT100	24871201	Res, Chip	200Ω	J 1/8W
RT101	24871201	Res, Chip	200Ω	J 1/8W
RT105	24872563	Res, Chip	56kΩ	J 1/16W
RT106	24872182	Res, Chip	1.8kΩ	J 1/16W
RT107	24871182	Res, Chip	1.8kΩ	J 1/8W
RT108	24872563	Res, Chip	56kΩ	J 1/16W
RT109	24872471	Res, Chip	470Ω	J 1/16W
RT110	24872684	Res, Chip	680kΩ	J 1/16W
RT111	70041554	Res, Chip	4.7MΩ	K 1/16W
RT112	24872224	Res, Chip	220kΩ	J 1/16W
RT113	70041554	Res, Chip	4.7MΩ	K 1/16W
RT116	24872101	Res, Chip	100Ω	J 1/16W
RT117	70040891	Res, Carbon	470Ω	J 0.2W
RT124	24872821	Res, Chip	820Ω	J 1/16W
RT125	24871181	Res, Chip	180Ω	J 1/8W
RT126	24871562	Res, Chip	5.6kΩ	J 1/8W
RT127	24871562	Res, Chip	5.6kΩ	J 1/8W
RT128	24871273	Res, Chip	27kΩ	J 1/8W
RT129	70040784	Res, Carbon	22kΩ	J 1/4W
RT130	24871472	Res, Chip	4.7kΩ	J 1/8W
RT131	24871221	Res, Chip	220Ω	J 1/8W
RT132	24871229	Res, Chip	2.2Ω	J 1/8W
RT133	24871229	Res, Chip	2.2Ω	J 1/8W
RT134	24871103	Res, Chip	10kΩ	J 1/8W
⚠RT135	70041236	Res, Fusible	1Ω	J 0.4W
RT136	24871103	Res, Chip	10kΩ	J 1/8W
RT138	70040106	Res, Carbon	10kΩ	J 1/4W
RT139	70040106	Res, Carbon	10kΩ	J 1/4W
RT145	70040106	Res, Carbon	10kΩ	J 1/4W
RT148	24871102	Res, Chip	1kΩ	J 1/8W
RT149	24871182	Res, Chip	1.8kΩ	J 1/8W
RT150	24871472	Res, Chip	4.7kΩ	J 1/8W
RT151	24871472	Res, Chip	4.7kΩ	J 1/8W
RT152	24872472	Res, Chip	4.7kΩ	J 1/16W
RT153	24871102	Res, Chip	1kΩ	J 1/8W
RT155	24871473	Res, Chip	47kΩ	J 1/8W
RT156	24871473	Res, Chip	47kΩ	J 1/8W
RT159	24871222	Res, Chip	2.2kΩ	J 1/8W
RT160	24872103	Res, Chip	10kΩ	J 1/16W
RT162	24871103	Res, Chip	10kΩ	J 1/8W
RT163	70041659	Res, Carbon	220Ω	J 1/4W
RT164	24871103	Res, Chip	10kΩ	J 1/8W
RT165	70041093	Chip Jumper		
RT166	70041659	Res, Carbon	220Ω	J 1/4W
RT167	24872103	Res, Chip	10kΩ	J 1/16W
RT168	24872473	Res, Chip	47kΩ	J 1/16W
RT169	24872303	Res, Chip	30kΩ	J 1/16W
RT170	24871181	Res, Chip	180Ω	J 1/8W
RT171	24871151	Res, Chip	150Ω	J 1/8W
RT176	24871103	Res, Chip	10kΩ	J 1/8W
RT177	24872472	Res, Chip	4.7kΩ	J 1/16W
RT178	24872472	Res, Chip	4.7kΩ	J 1/16W
RT179	70041677	Res, Chip	2.2kΩ	G 1/10W
RT180	70041677	Res, Chip	2.2kΩ	G 1/10W
RT181	24871103	Res, Chip	10kΩ	J 1/8W
RT182	70041675	Res, Chip	16kΩ	J 1/8W
RT200	24871152	Res, Chip	1.5kΩ	J 1/8W
RT201	24871152	Res, Chip	1.5kΩ	J 1/8W
RT202	24871152	Res, Chip	1.5kΩ	J 1/8W
RT203	70040103	Res, Carbon	1kΩ	J 1/4W
RV001	24872105	Res, Chip	1MΩ	J 1/16W
RV004	24872102	Res, Chip	1kΩ	J 1/16W
RV005	24872512	Res, Chip	5.1kΩ	J 1/16W
RV011	70041096	Chip Jumper		

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RV019	24872680	Res, Chip	68Ω	J 1/16W
RV022	24872222	Res, Chip	2.2kΩ	J 1/16W
RV023	24872102	Res, Chip	1kΩ	J 1/16W
RV025	24872104	Res, Chip	100kΩ	J 1/16W
RV026	24872333	Res, Chip	33kΩ	J 1/16W
RV028	24872223	Res, Chip	22kΩ	J 1/16W
RV030	24872334	Res, Chip	330kΩ	J 1/16W
RV032	24872102	Res, Chip	1kΩ	J 1/16W
RV034	24872473	Res, Chip	47kΩ	J 1/16W
RV035	70040962	Res, Carbon	47kΩ	J 1/4W
RV036	24872473	Res, Chip	47kΩ	J 1/16W
RV040	24872473	Res, Chip	47kΩ	J 1/16W
RV043	24872472	Res, Chip	4.7kΩ	J 1/16W
RV044	24872102	Res, Chip	1kΩ	J 1/16W
RV045	24872105	Res, Chip	1MΩ	J 1/16W
RV046	24872105	Res, Chip	1MΩ	J 1/16W
RV047	24871682	Res, Chip	6.8kΩ	J 1/8W
RV048	24872103	Res, Chip	10kΩ	J 1/16W
RV049	24871103	Res, Chip	10kΩ	J 1/8W
RV050	24872681	Res, Chip	680Ω	J 1/16W
RV052	24872102	Res, Chip	1kΩ	J 1/16W
RV053	24871821	Res, Chip	820Ω	J 1/8W
RV054	24872102	Res, Chip	1kΩ	J 1/16W
RV055	24872621	Res, Chip	620Ω	J 1/16W
RV056	24872751	Res, Chip	750Ω	J 1/16W
RV070	24871561	Res, Chip	560Ω	J 1/8W
RV071	70041096	Chip Jumper		
RV074	24872222	Res, Chip	2.2kΩ	J 1/16W
RV080	70041096	Chip Jumper		
RV082	70041093	Chip Jumper		
RV083	70041096	Chip Jumper		
RV101	24872821	Res, Chip	820Ω	J 1/16W
RV102	24872113	Res, Chip	11kΩ	J 1/16W
RV103	24872682	Res, Chip	6.8kΩ	J 1/16W
RV104	70041096	Chip Jumper		
RV105	24872102	Res, Chip	1kΩ	J 1/16W
RV106	24872471	Res, Chip	470Ω	J 1/16W
RV107	24872122	Res, Chip	1.2kΩ	J 1/16W
RV108	24872123	Res, Chip	12kΩ	J 1/16W
RV109	24872123	Res, Chip	12kΩ	J 1/16W
RV110	24872471	Res, Chip	470Ω	J 1/16W
RV111	24871272	Res, Chip	2.7kΩ	J 1/8W
RV114	24872823	Res, Chip	82kΩ	J 1/16W
RV115	24872223	Res, Chip	22kΩ	J 1/16W
RV116	24872821	Res, Chip	820Ω	J 1/16W
RV118	24872102	Res, Chip	1kΩ	J 1/16W
RV119	70041096	Chip Jumper		
RV120	24872104	Res, Chip	100kΩ	J 1/16W
RV122	24872102	Res, Chip	1kΩ	J 1/16W
RV124	70041068	Res, Carbon	2.2kΩ	J
RV128	24872229	Res, Chip	2.2Ω	J 1/16W
RV129	24872681	Res, Chip	680Ω	J 1/16W
RV130	70040103	Res, Carbon	1kΩ	J 1/4W
RV131	24872182	Res, Chip	1.8kΩ	J 1/16W
RV132	24871102	Res, Chip	1kΩ	J 1/8W
RV133	24872472	Res, Chip	4.7kΩ	J 1/16W
RV134	24871223	Res, Chip	22kΩ	J 1/8W
RV137	24872823	Res, Chip	82kΩ	J 1/16W
RV138	24872223	Res, Chip	22kΩ	J 1/16W
RV139	24872104	Res, Chip	100kΩ	J 1/16W
RV902	70041096	Chip Jumper		
RW001	70040118	Res, Carbon	4.7kΩ	J 1/4W
RW002	24872122	Res, Chip	1.2kΩ	J 1/16W
RW005	24871223	Res, Chip	22kΩ	J 1/8W
RW006	24872472	Res, Chip	4.7kΩ	J 1/16W
RW008	24871103	Res, Chip	10kΩ	J 1/8W
RW009	24871103	Res, Chip	10kΩ	J 1/8W
RW010	24871103	Res, Chip	10kΩ	J 1/8W
RW011	24871103	Res, Chip	10kΩ	J 1/8W
⚠RW012	70041074	Res, Fusible	27Ω	J 0.3W
RW019	24871152	Res, Chip	1.5kΩ	J 1/8W
RW020	24871152	Res, Chip	1.5kΩ	J 1/8W
⚠RW021	70041672	Res, Fusible	5.6Ω	J 0.3W
RW024	70040703	Res, Carbon	27kΩ	J 1/4W
RW025	24872392	Res, Chip	3.9kΩ	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RW027	24871339	Res, Chip	3.3Ω	J 1/8W
RW028	24871339	Res, Chip	3.3Ω	J 1/8W
RW029	24871339	Res, Chip	3.3Ω	J 1/8W
RW030	24871332	Res, Chip	3.3kΩ	J 1/8W
RZ001	70040118	Res, Carbon	4.7kΩ	J 1/4W
RZ007	24872221	Res, Chip	220Ω	J 1/16W
RZ008	24871221	Res, Chip	220Ω	J 1/8W
RZ015	70040103	Res, Carbon	1kΩ	J 1/4W
RZ030	24872102	Res, Chip	1kΩ	J 1/16W
RZ031	24872102	Res, Chip	1kΩ	J 1/16W
RZ035	70041096	Chip Jumper		
RZ037	24872152	Res, Chip	1.5kΩ	J 1/16W
RZ050	24872681	Res, Chip	680Ω	J 1/16W
RZ051	70041094	Res, Chip	130Ω	J
RZ052	24872471	Res, Chip	470Ω	J 1/16W
RZ053	70040570	Res, Chip	470Ω	J 1/16W
RZ054	70040103	Res, Carbon	1kΩ	J 1/4W
RZ055	24872102	Res, Chip	1kΩ	J 1/16W
RZ056	24872471	Res, Chip	470Ω	J 1/16W
RZ058	24872472	Res, Chip	4.7kΩ	J 1/16W
RZ065	70041660	Res, Carbon	100Ω	J 0.43W
RZ066	70041658	Res, Carbon	82Ω	J 1/4W
JS007	70041093	Chip Jumper		
JS009	70041096	Chip Jumper		
JS012	70041093	Chip Jumper		
JS017	70041093	Chip Jumper		
JS019	70041093	Chip Jumper		
JS020	70041093	Chip Jumper		
JS021	70041093	Chip Jumper		
JS026	70041093	Chip Jumper		
JS027	70041096	Chip Jumper		
JS037	70041093	Chip Jumper		
JS039	70041093	Chip Jumper		
JS042	70041096	Chip Jumper		
JS051	70041093	Chip Jumper		
JS104	70041096	Chip Jumper		
JS109	70041093	Chip Jumper		
JS122	70041093	Chip Jumper		
JS123	70041093	Chip Jumper		
JS125	70041096	Chip Jumper		
JT004	70041093	Chip Jumper		
JT006	70041093	Chip Jumper		
JT009	70041096	Chip Jumper		
JT018	70041093	Chip Jumper		
JT032	70041093	Chip Jumper		
JT044	70041093	Chip Jumper		
JT070	70041096	Chip Jumper		
JT083	70041093	Chip Jumper		
JT099	70041093	Chip Jumper		
JT111	70041093	Chip Jumper		
JT115	70041093	Chip Jumper		
JT127	70041093	Chip Jumper		
JT129	70041093	Chip Jumper		
JT130	70041093	Chip Jumper		
JT155	70041093	Chip Jumper		
JT156	70041093	Chip Jumper		
JT164	70041093	Chip Jumper		
JT169	70041093	Chip Jumper		
JT172	70041093	Chip Jumper		
JT176	70041093	Chip Jumper		
JT182	70041093	Chip Jumper		
JT183	70041093	Chip Jumper		
JT185	70041093	Chip Jumper		
JT192	70041093	Chip Jumper		
JT206	70041093	Chip Jumper		
JT207	70041093	Chip Jumper		
JT214	70041093	Chip Jumper		
JT226	70041096	Chip Jumper		
JV004	70041096	Chip Jumper		
JV005	70041093	Chip Jumper		
JV010	70041093	Chip Jumper		
JV019	70041096	Chip Jumper		
JV024	70041096	Chip Jumper		
JV026	70041096	Chip Jumper		
JV040	70041096	Chip Jumper		

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
JV043	70041093	Chip Jumper		
JV044	70041096	Chip Jumper		
JV049	70041093	Chip Jumper		
JV054	70041093	Chip Jumper		
JV100	70041093	Chip Jumper		
JV130	70041093	Chip Jumper		
JV136	70041093	Chip Jumper		
JV139	70041093	Chip Jumper		
JV140	70041093	Chip Jumper		
JV142	70041096	Chip Jumper		
JV145	70041096	Chip Jumper		
JV150	70041093	Chip Jumper		
JV204	70041093	Chip Jumper		
JV205	70041096	Chip Jumper		
JW004	70041096	Chip Jumper		
JW006	70041093	Chip Jumper		
JW009	70041093	Chip Jumper		
JW016	70041093	Chip Jumper		
JW017	70041093	Chip Jumper		
JW030	70041096	Chip Jumper		
JZ003	70041093	Chip Jumper		
JZ011	70041093	Chip Jumper		
JZ012	70041093	Chip Jumper		
JZ029	70041093	Chip Jumper		
JZ040	70041093	Chip Jumper		
JZ042	70041096	Chip Jumper		
JZ045	70041093	Chip Jumper		
JZ054	70041093	Chip Jumper		
JZ069	70041093	Chip Jumper		
JZ076	70041096	Chip Jumper		
CC116	70041096	Chip Jumper		
CV010	70041096	Chip Jumper		
CV090	70041093	Chip Jumper		
LZ002	70041093	Chip Jumper		
PS034	24066742	Res, Variable	100kΩ	
		- MISCELLANEOUS -		
0010M	70011844	Tuner		
0020M	70011947	IF Module		
FZ051	70011261	Filter	5.5MHz	
GT101	70011793	Photo Interrupter	GP1S562	
GT102	70011793	Photo Interrupter	GP1S562	
GT105	70011828	Hall Sensor	HW300B	
MT001	70031317	Stator		
QT100	70010116	Crystal, 32kHz		
QT102	70011961	Crystal	17.734MHz	
QV018	70012051	Crystal	4.43MHz	
ST002	70011826	Switch, Push		
■0030M	70090491	P C Board Assy	Terminal	
		- INTEGRATED CIRCUITS -		
IX001	70011881	IC	STV6400	
IX020	70011975	IC	MC14052/BCP	
IX040	70119727	IC	MC14053BCP	
		- TRANSISTORS -		
TG029	23114454	Transistor	DTC144E	
TG030	23114454	Transistor	DTC144E	
TX002	70010134	Transistor	BC548B	
		- DIODES -		
DG020	70010153	Diode	1N4148	
DG034	70010153	Diode	1N4148	
		- COILS -		
LX001	70010642	Coil, Peaking		
LX002	70011954	Coil, Peaking		
LX003	70012094	Coil, Peaking		
LY001	70011953	Coil, Peaking		
		- CAPACITORS -		
CX001	24203470	Cap, Electrolytic	47μF	M 16V
CX002	70040052	Cap, Plastic	100nF	M 63V
CX003	70040052	Cap, Plastic	100nF	M 63V
CX004	70040052	Cap, Plastic	100nF	M 63V
CX005	70040052	Cap, Plastic	100nF	M 63V
CX006	70040052	Cap, Plastic	100nF	M 63V
CX008	70040052	Cap, Plastic	100nF	M 63V
CX009	24203470	Cap, Electrolytic	47μF	M 16V
CX010	70040052	Cap, Plastic	100nF	M 63V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CX016	24203470	Cap, Electrolytic	47μF	M 16V
CX017	70040052	Cap, Plastic	100nF	M 63V
CX018	24473470	Cap, Ceramic	47pF	J 50V
CX023	24436271	Cap, Ceramic	270pF	J 50V
CX050	70040738	Cap, Electrolytic	4.7μF	25V
CX051	24633220	Cap, Electrolytic	22μF	M 16V
CX055	24203470	Cap, Electrolytic	47μF	M 16V
CX056	70040052	Cap, Plastic	100nF	M 63V
CX057	70040500	Cap, Plastic	8.2nF	J 63V
CX061	70040300	Cap, Ceramic	1nF	K 50V
CX070	24206479	Cap, Electrolytic	4.7μF	M 50V
CX071	70040530	Cap, Electrolytic	100μF	M 16V
CX072	24630852	Cap, Electrolytic	22μF	M 16V
CX073	70040500	Cap, Plastic	8.2nF	J 63V
CX091	70040300	Cap, Ceramic	1nF	K 50V
CX100	24636229	Cap, Electrolytic	2.2μF	M 50V
CY001	70041647	Cap, Ceramic	150pF	G 50V
CY002	70041109	Cap, Plastic	330nF	K 50V
CY003	70041187	Cap, Plastic	33nF	K 100V
CY004	70040045	Cap, Plastic	47nF	K 63V
CY005	24203470	Cap, Electrolytic	47μF	M 16V
		- RESISTORS -		
RG020	70040963	Res, Carbon	8.2kΩ	J 1/4W
RG021	70041665	Res, Carbon	5.6kΩ	J 1/4W
RG030	70040844	Res, Carbon	1kΩ	J 1/4W
RG031	70040852	Res, Carbon	10kΩ	J 1/4W
RG032	70040846	Res, Carbon	820Ω	J 1/4W
RG033	70040846	Res, Carbon	820Ω	J 1/4W
RG034	70040963	Res, Carbon	8.2kΩ	J 1/4W
RG035	70041665	Res, Carbon	5.6kΩ	J 1/4W
RG057	70040845	Res, Carbon	680Ω	J 1/4W
RX002	70040842	Res, Carbon	470Ω	J
RX018	70040839	Res, Carbon	100Ω	J 1/4W
RX021	70040844	Res, Carbon	1kΩ	J 1/4W
RX023	70040963	Res, Carbon	8.2kΩ	J 1/4W
RX024	70040852	Res, Carbon	10kΩ	J 1/4W
RX025	70040848	Res, Carbon	100kΩ	J
RX033	70040848	Res, Carbon	100kΩ	J
RX050	70041666	Res, Carbon	470kΩ	J 1/4W
RX051	70041664	Res, Carbon	220kΩ	J 1/4W
RX053	70040844	Res, Carbon	1kΩ	J 1/4W
RX054	70040848	Res, Carbon	100kΩ	J
RX060	70041665	Res, Carbon	5.6kΩ	J 1/4W
RX061	70041665	Res, Carbon	5.6kΩ	J 1/4W
RX070	70041664	Res, Carbon	220kΩ	J 1/4W
RX071	70041666	Res, Carbon	470kΩ	J 1/4W
RX072	70040844	Res, Carbon	1kΩ	J 1/4W
RX073	70040845	Res, Carbon	680Ω	J 1/4W
RX080	70041663	Res, Carbon	75Ω	J 1/4W
RX081	70040838	Res, Carbon	68Ω	J 1/4W
RX089	70040845	Res, Carbon	680Ω	J 1/4W
RX090	70041665	Res, Carbon	5.6kΩ	J 1/4W
RX091	70041665	Res, Carbon	5.6kΩ	J 1/4W
RX092	70041663	Res, Carbon	75Ω	J 1/4W
RX093	70040838	Res, Carbon	68Ω	J 1/4W
RX094	70040848	Res, Carbon	100kΩ	J
RX095	70040848	Res, Carbon	100kΩ	J
RX096	70040848	Res, Carbon	100kΩ	J
RX097	70040845	Res, Carbon	680Ω	J 1/4W
RX100	70040850	Res, Carbon	2.7kΩ	J
RX212	70041667	Res, Carbon	12kΩ	J 1/4W
RX213	70040811	Res, Carbon	3.3kΩ	J
RY001	70040849	Res, Carbon	2.2kΩ	J
RY002	70041668	Res, Carbon	1MΩ	J 1/4W
RY003	70041669	Res, Carbon	1.2MΩ	J 0.14W
RY004	70040851	Res, Carbon	6.8kΩ	J
RY005	70041661	Res, Carbon	820kΩ	J 0.14W
RY006	70040848	Res, Carbon	100kΩ	J
		- MISCELLANEOUS -		
BX01A	70011976	Wire		
■0043M	70090586	P C Board Assy	CCD Amp	
		- TRANSISTORS -		
TV092	70010150	Transistor	BC848B	
TV093	70010150	Transistor	BC848B	
		- COILS -		
LV092	70011848	Coil, Peaking		
		- CAPACITORS -		
CV092	24783330	Cap, Chip	33pF	J 50V
CV094	24092178	Cap, Chip	0.1μF	K 25V
CV109	70041654	Cap, Chip	10nF	K 25V
		- RESISTORS -		
RV092	24872471	Res, Chip	470Ω	J 1/16W
RV093	24872222	Res, Chip	2.2kΩ	J 1/16W
RV094	24872681	Res, Chip	680Ω	J 1/16W
RV095	24872101	Res, Chip	100Ω	J 1/16W
RV096	24872561	Res, Chip	560Ω	J 1/16W
■0042M	70091919	P C Board Assy	OSD Mix	
		- TRANSISTORS -		
TV125	70010150	Transistor	BC848B	
TV140	70010947	Transistor	BC858	
TV141	70010947	Transistor	BC858	
TV142	70010150	Transistor	BC848B	
TV143	70010150	Transistor	BC848B	
TV144	70010947	Transistor	BC858	
TV145	70010150	Transistor	BC848B	
		- COILS -		
LV124	23289270	Coil, Peaking	TRF4270AF	
LV125	23289270	Coil, Peaking	TRF4270AF	
LV140	70012095	Coil, Peaking		
		- CAPACITORS -		
CV124	24774100	Cap, Chip	10pF	D 50V
CV125	24783399	Cap, Chip	3.9pF	
CV126	24774330	Cap, Chip	33pF	J 50V
CV127	70041650	Cap, Chip	8pF	D
CV128	24774180	Cap, Chip	18pF	J 50V
CV140	24783330	Cap, Chip	33pF	J 50V
CV141	24092178	Cap, Chip	0.1μF	K 25V
CV142	70041183	Cap, Electrolytic	47μF	M 16V
CV143	70041188	Cap, Electrolytic	10μF	M 16V
		- RESISTORS -		
RV125	70041096	Chip Jumper		
RV126	24872102	Res, Chip	1kΩ	J 1/16W
RV140	24872102	Res, Chip	1kΩ	J 1/16W
RV141	24872102	Res, Chip	1kΩ	J 1/16W
RV142	24872102	Res, Chip	1kΩ	J 1/16W
RV143	24872103	Res, Chip	10kΩ	J 1/16W
RV144	24872272	Res, Chip	2.7kΩ	J 1/16W
RV145	24872222	Res, Chip	2.2kΩ	J 1/16W
RV146	24872333	Res, Chip	33kΩ	J 1/16W
RV147	24872103	Res, Chip	10kΩ	J 1/16W
RV148	24872102	Res, Chip	1kΩ	J 1/16W
RV149	24872391	Res, Chip	390Ω	J 1/16W
RV151	24872682	Res, Chip	6.8kΩ	J 1/16W
RV152	24872331	Res, Chip	330Ω	J 1/16W
RV153	24872182	Res, Chip	1.8kΩ	J 1/16W
RV154	24872223	Res, Chip	22kΩ	J 1/16W
JV161	70041093	Chip Jumper		
■0040M	70090680	P C Board Assy	PBEQ	
		- TRANSISTORS -		
TV005	A6004020	Transistor, Chip	RN1402	
TV006	70010150	Transistor	BC848B	
TV007	70010150	Transistor	BC848B	
TV008	70010947	Transistor	BC858	
TV010	70010150	Transistor	BC848B	
TV121	70010942	Transistor	BC848	
TV122	A6004020	Transistor, Chip	RN1402	
TV123	70010150	Transistor	BC848B	
		- COILS -		
LV006	70012096	Coil, Peaking		
LV010	70011577	Coil, Peaking		
LV037	70012095	Coil, Peaking		
LV121	23289121	Coil, Peaking	TRF4121AF	
LV122	70012095	Coil, Peaking		
		- CAPACITORS -		
CV006	70041651	Cap, Chip	560pF	J 50V
CV007	24774101	Cap, Chip	100pF	J 50V
CV008	70041853	Cap, Electrolytic	10μF	M 16V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CV009	70041870	Cap, Chip	39pF	J 50V
CV011	70041657	Cap, Chip	22nF	K 25V
CV029	24783680	Cap, Chip	68pF	J 50V
CV037	70041326	Cap, Chip	56pF	J 50V
CV121	24783181	Cap, Chip	180pF	J 50V
CV129	70041858	Cap, Chip	300pF	J 50V
CV130	70041855	Cap, Chip	22pF	J 50V
CV134	70041860	Cap, Chip	24pF	J 50V
CV135	24774070	Cap, Chip	7pF	D 50V
		- RESISTORS -		
RV003	24872332	Res, Chip	3.3kΩ	J 1/16W
RV006	24872152	Res, Chip	1.5kΩ	J 1/16W
RV007	24872271	Res, Chip	270Ω	J 1/16W
RV008	24872102	Res, Chip	1kΩ	J 1/16W
RV009	24872331	Res, Chip	330Ω	J 1/16W
RV010	70040103	Res, Chip	1kΩ	J 1/4W
RV014	24872101	Res, Chip	100Ω	J 1/16W
RV015	24872222	Res, Chip	2.2kΩ	J 1/16W
RV016	24872681	Res, Chip	680Ω	J 1/16W
RV018	24872681	Res, Chip	680Ω	J 1/16W
RV020	24872152	Res, Chip	1.5kΩ	J 1/16W
RV021	24872182	Res, Chip	1.8kΩ	J 1/16W
RV024	24872821	Res, Chip	820Ω	J 1/16W
RV121	70040686	Res, Chip	1.5kΩ	J 1/8W
RV150	24872222	Res, Chip	2.2kΩ	J 1/16W
		- MISCELLANEOUS -		
BV048	23164506	Plug 2P		
■0041M	70091918	P C Board Assy	CHR DLY	
		- TRANSISTORS -		
TV002	A6004020	Transistor, Chip	RN1402	
TV060	70010947	Transistor	BC858	
TV061	70010150	Transistor	BC848B	
		- COILS -		
LV002	70011576	Coil, Peaking		
LV060	70012098	Coil, Peaking		
LV095	70011577	Coil, Peaking		
		- CAPACITORS -		
CV002	70041859	Cap, Chip	680pF	J 50V
CV028	70041241	Cap, Electrolytic	47μF	M 16V
CV060	24783121	Cap, Chip	120pF	J 50V
CV096	24774330	Cap, Chip	33pF	J 50V
CV097	24774101	Cap, Chip	100pF	J 50V
		- RESISTORS -		
RV002	24872271	Res, Chip	270Ω	J 1/16W
RV060	24872102	Res, Chip	1kΩ	J 1/16W
RV061	24872821	Res, Chip	820Ω	J 1/16W
RV062	70041096	Chip Jumper		
RV063	24872101	Res, Chip	100Ω	J 1/16W
RV064	24872102	Res, Chip	1kΩ	J 1/16W
RV097	24872102	Res, Chip	1kΩ	J 1/16W
RV098	24872222	Res, Chip	2.2kΩ	J 1/16W
RV123	24872271	Res, Chip	270Ω	J 1/16W
JV160	70041096	Chip Jumper		
CV095	70041096	Chip Jumper		
■0150M	70090494	P C Board Assy	Power	
		- INTEGRATED CIRCUITS -		
IP001	70011972	IC	U4614B	
IP002	70011699	IC	LM393N	
		- TRANSISTORS -		
TP001	70011962	Transistor, Chip	BUL310XI	
TP091	70011386	Transistor	2SA1020-Y	
		- DIODES -		
DP001	70010956	Diode	1N4007	
DP002	70010956	Diode	1N4007	
DP003	70010956	Diode	1N4007	
DP004	70010956	Diode	1N4007	
DP005	70010954	Diode	BA158	
DP007	70010450	Diode	BA157	
DP008	70010817	Diode	1N4148	
DP009	70010817	Diode	1N4148	
DP041	70010450	Diode	BA157	
DP051	70011966	Diode	BAV20	
DP052	70011966	Diode	BAV20	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
DP061	70011965	Diode	BA157	
DP071	70011966	Diode	BAV20	
DP080	70010417	Diode	1N5822	
DP090	70011964	Diode	FUF5404	
DP093	70010817	Diode	1N4148	
DP094	70011286	Diode, Zener	ZPD5.6	
DP095	70010955	Diode	MUR115	
0010	70011334	Diode	BA158	
		- COILS -		
LP071	23238916	Coil, Peaking	TRF4330AC	
LP081	70011955	Coil, Peaking		
LP091	70011952	Coil, Peaking		
		- CAPACITORS -		
⚠CP001	70040056	Cap, Plastic	100nF	M 275V
⚠CP002	70041047	Cap, Electrolytic	47μF	M 385V
⚠CP003	70041646	Cap, Ceramic	2.2nF	M 400V
CP004	70041370	Cap, Ceramic	100pF	K 1kV
CP005	24774100	Cap, Chip	10pF	D 50V
CP006	70041656	Cap, Chip	4.7nF	M 50V
CP007	24797100	Cap, Electrolytic	10μF	M 50V
CP008	70040725	Cap, Electrolytic	100μF	M 25V
CP009	70041118	Cap, Chip	220pF	J 50V
⚠CP011	70041636	Cap, Plastic	2.2nF	M
CP015	70041653	Cap, Chip	470pF	J 50V
CP020	70041532	Cap, Chip	330pF	J 50V
CP041	70040412	Cap, Electrolytic	220μF	M 10V
CP051	24636010	Cap, Electrolytic	1μF	M 50V
CP054	24797100	Cap, Electrolytic	10μF	M 50V
CP055	70040096	Cap, Ceramic	470pF	M 400V
CP056	70041633	Cap, Plastic	10nF	K 100V
CP061	70041638	Cap, Electrolytic	470μF	M 25V
CP071	70040772	Cap, Electrolytic	47μF	M 50V
CP072	70041562	Cap, Chip	100nF	Z 50V
CP073	70040096	Cap, Ceramic	470pF	M 400V
CP081	70041637	Cap, Electrolytic	1000μF	M 16V
CP082	70041045	Cap, Electrolytic	1000μF	X
CP092	70041638	Cap, Electrolytic	470μF	M 25V
CP093	70041642	Cap, Electrolytic	470μF	25V
CP094	70041328	Cap, Chip	100nF	Z 25V
CP095	70040980	Cap, Chip	100pF	J 50V
		- RESISTORS -		
RP001	24872103	Res, Chip	10kΩ	J 1/16W
RP002	24871153	Res, Chip	15kΩ	J 1/8W
RP003	24872823	Res, Chip	82kΩ	J 1/16W
RP004	24872223	Res, Chip	22kΩ	J 1/16W
RP005	24872223	Res, Chip	22kΩ	J 1/16W
RP006	24872223	Res, Chip	22kΩ	J 1/16W
RP007	24872223	Res, Chip	22kΩ	J 1/16W
RP008	24872473	Res, Chip	47kΩ	J 1/16W
RP009	24872104	Res, Chip	100kΩ	J 1/16W
RP010	24871153	Res, Chip	15kΩ	J 1/8W
RP011	24871153	Res, Chip	15kΩ	J 1/8W
RP012	24871153	Res, Chip	15kΩ	J 1/8W
RP013	70041874	Res, Chip	6.8kΩ	F 1/10W
RP014	24872222	Res, Chip	2.2kΩ	J 1/16W
RP015	70041678	Res, Chip	3.9Ω	K
RP016	24872330	Res, Chip	33Ω	J 1/16W
RP017	24871100	Res, Chip	10Ω	J 1/8W
⚠RP018	70041078	Res, Fusible	1.5Ω	J 0.3W
RP019	24871182	Res, Chip	1.8kΩ	J 1/8W
RP020	24872270	Res, Chip	27Ω	J 1/16W
⚠RP021	70041673	Res, Fusible	2.2kΩ	J 0.3W
RP022	24872104	Res, Chip	100kΩ	J 1/16W
RP026	24872473	Res, Chip	47kΩ	J 1/16W
RP027	24871153	Res, Chip	15kΩ	J 1/8W
RP028	24871153	Res, Chip	15kΩ	J 1/8W
RP031	24872393	Res, Chip	39kΩ	J 1/16W
RP032	24872752	Res, Chip	7.5kΩ	J 1/16W
⚠RP041	70041081	Res, Fusible	0.1Ω	F 0.4W
⚠RP042	70040456	Res, Fusible	10Ω	J
⚠RP051	70041116	Res, Fusible	39Ω	J 0.3W
RP052	24871102	Res, Chip	1kΩ	J 1/8W
RP053	24872473	Res, Chip	47kΩ	J 1/16W
RP054	24872822	Res, Chip	8.2kΩ	J 1/16W
RP057	24872333	Res, Chip	33kΩ	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RP061	24871682	Res, Chip	6.8kΩ	J 1/8W
RP062	24871682	Res, Chip	6.8kΩ	J 1/8W
RP063	24871682	Res, Chip	6.8kΩ	J 1/8W
⚠RP071	70040125	Res, Carbon	47Ω	J 0.3W
RP072	24871153	Res, Chip	15kΩ	J 1/8W
RP089	24872182	Res, Chip	1.8kΩ	J 1/16W
⚠RP091	70041081	Res, Fusible	0.1Ω	F 0.4W
⚠RP092	70041670	Res, Fusible	120Ω	J 0.3W
RP093	24872682	Res, Chip	6.8kΩ	J 1/16W
RP094	70040895	Res, Carbon	820Ω	J 1/4W
RP095	24872393	Res, Chip	39kΩ	J 1/16W
RP096	24872102	Res, Chip	1kΩ	J 1/16W
RP097	70041679	Res, Chip	1.5kΩ	F 1/10W
JP001	70041093	Chip Jumper		
JP010	70041093	Chip Jumper		
JP011	70041093	Chip Jumper		
		- MISCELLANEOUS -		
⚠BP001	70011176	Inlet		
⚠FP001	70010445	Fuse, 1A, 250V		
⚠LP001	70011950	Line Filter		
⚠LP002	70011949	Line Filter		
⚠LP020	70011948	Power Transformer		
■0210M	70090528	P C Board Assy	KDB	
		- INTEGRATED CIRCUITS -		
ICK01	70012122	IC	TMP87CK70AF-6204	
		- TRANSISTORS -		
TK01	A6325549	Transistor	2SC2236-Y	
TK02	A6004010	Transistor, Chip	RN1401	
TK03	70011788	Transistor, Chip	RN2402	
TK04	70010331	Transistor	BC847B	
		- DIODES -		
DK03	70011969	Diode, Zener	ZMM5.6V	
DK05	70010342	Diode, Chip	LL4148	
GK02	70011589	Diode, LED	SE307-C	
GK03	70011589	Diode, LED	SE307-C	
		- CAPACITORS -		
CK02	70041376	Cap, Chip	10nF	Z 50V
CK04	70041376	Cap, Chip	10nF	Z 50V
CK05	70041103	Cap, Chip	33pF	J 50V
CK06	70041103	Cap, Chip	33pF	J 50V
CK07	24202101	Cap, Electrolytic	100μF	M 10V
CK08	70041376	Cap, Chip	10nF	Z 50V
CK10	70040647	Cap, Electrolytic	47μF	M 10V
CK12	24814223	Cap, Chip	2200pF	Z 50V
CK20	70041376	Cap, Chip	10nF	Z 50V
CK30	70040489	Cap, Cip	82pF	J 50V
		- RESISTORS -		
RK01	70041168	Res, Chip	15Ω	J 1/10W
RK02	70041168	Res, Chip	15Ω	J 1/10W
RK03	70041138	Res, Chip	5.6kΩ	J 1/10W
RK10	70040358	Res, Chip	10kΩ	J 1/16W
RK11	70040358	Res, Chip	10kΩ	J 1/16W
RK12	70040358	Res, Chip	10kΩ	J 1/16W
RK13	70040358	Res, Chip	10kΩ	J 1/16W
RK14	70040358	Res, Chip	10kΩ	J 1/16W
RK15	70040358	Res, Chip	10kΩ	J 1/16W
RK16	70040350	Res, Chip	220Ω	J 1/16W
RK17	70040358	Res, Chip	10kΩ	J 1/16W
RK18	70040358	Res, Chip	10kΩ	J 1/16W
RK19	70040350	Res, Chip	220Ω	J 1/16W
RK20	70040358	Res, Chip	10kΩ	J 1/16W
RK24	70040357	Res, Chip	22kΩ	J 1/16W
RK25	70040357	Res, Chip	22kΩ	J 1/16W
RK26	70011425	Res, Chip	3kΩ	
RK27	70011425	Res, Chip	3kΩ	
RK28	70011425	Res, Chip	3kΩ	
RK29	70011425	Res, Chip	3kΩ	
RK30	70040337	Res, Chip	270Ω	J 1/16W
RK31	70041712	Res, Chip	9.1kΩ	J 1/10W
RK33	70040358	Res, Chip	10kΩ	J 1/16W
RK34	70040358	Res, Chip	10kΩ	J 1/16W
RK35	70040358	Res, Chip	10kΩ	J 1/16W
RK36	70040358	Res, Chip	10kΩ	J 1/16W
RK38	70040354	Res, Chip	1kΩ	J 1/16W
RK39	70011426	Res, Chip	2kΩ	
RK40	70011425	Res, Chip	3kΩ	
RK41	70040357	Res, Chip	22kΩ	J 1/16W
RK42	70040357	Res, Chip	22kΩ	J 1/16W
RK43	70040358	Res, Chip	10kΩ	J 1/16W
RK44	70040373	Res, Chip	47kΩ	J 1/16W
RK46	70041171	Res, Chip	1.2kΩ	J 1/10W
RK48	70040354	Res, Chip	1kΩ	J 1/16W
RK50	70040354	Res, Chip	1kΩ	J 1/16W
RK51	70041709	Res, Chip	2.2kΩ	G 1/10W
RK53	70041389	Res, Chip	6.2kΩ	J 1/10W
RK54	70040357	Res, Chip	22kΩ	J 1/16W
RK55	70040358	Res, Chip	10kΩ	J 1/16W
RK60	70041618	Res, Oxide Mental	3.3Ω	J 1W
RK63	70041600	Res, Oxide Mental	6.8Ω	J 1W
RK65	70040354	Res, Chip	1kΩ	J 1/16W
RK67	70040373	Res, Chip	47kΩ	J 1/16W
RK68	70040391	Chip Jumper		
RK69	70040391	Chip Jumper		
RK70	70040391	Chip Jumper		
RK71	70040391	Chip Jumper		
		- MISCELLANEOUS -		
GK01	70011971	FIP	6-MT-215GK	
IR01	70011443	F.U.	IR-9106A-D	
QK01	70010937	Resonator	8MHz	
SK03	23344094	Push Switch		
SK04	23344094	Push Switch		
SK06	23344094	Push Switch		
SK07	23344094	Push Switch		
SK08	23344094	Push Switch		
SK10	23344094	Push Switch		
SK13	23344094	Push Switch		
SK14	23344094	Push Switch		
■0212M	70090542	P C Board Assy	FCB	
		- DIODES -		
GK04	A8606316	Diode, LED	TLG133A-FA	
GK05	70011589	Diode, LED	SE307-C	
GK06	A8606316	Diode, LED	TLG133A-FA	
		- CAPACITORS -		
CK21	70041707	Cap, Chip	1nF	Z 50V
		- RESISTORS -		
RK49	70040374	Res, Chip	82kΩ	J 1/16W
RK72	70040354	Res, Chip	1kΩ	J 1/16W
RK75	70041441	Res, Chip	75Ω	J 1/10W
		- MISCELLANEOUS -		
P201	70011825	Phono Jack		
P701	70012041	Socket		
PK05	70011350	Phono Jack		
SK16	23344094	Push Switch		

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SPECIFICATIONS

Format	:	VHS standard
Recording system	:	Rotary, 2-head helical scan system
Video heads	:	2 heads
Video signal system	:	CCIR; 625 lines, 50 fields, PAL/SECAM colour signal NTSC colour, 525 lines
Tape speed	:	23.39 mm/s (PAL/MESECAM) 33.35 mm/s (NTSC)
Recording time	:	240 minutes with E240 cassettes
Winding time	:	Approx. 110 seconds with E180 cassettes
Dimensions	:	370 (W) × 89 (H) × 306.5 (D) mm
Mass	:	4.0 kg
Operating temperature	:	+5 to +40°C
Operating humidity	:	Less than 80% RH
Mains power	:	220 – 240 V AC, 50 Hz
Power consumption	:	21 W (in operation)

CONNECTORS

Aerial input	:	75 Ω coaxial
Aerial output	:	75 Ω coaxial
Video input	:	AUDIO/VIDEO SCART socket, 1.0 V(p-p), 75 Ω LINE IN 2 VIDEO Phono type jack, 1.0 V(p-p), 75 Ω
Audio input	:	AUDIO/VIDEO SCART socket, 308 mV(rms), more than 10 kΩ LINE IN 2 AUDIO Phono type jacks, 308 mV(rms), more than 47 kΩ
Video output	:	AUDIO/VIDEO SCART socket, 1.0 V(p-p), 75 Ω
Audio output	:	AUDIO/VIDEO SCART socket, 308 mV(rms), less than 1.0 kΩ

VIDEO

Signal-to-noise ratio	:	More than 43 dB (PAL)

AUDIO

Signal-to-noise ratio	:	More than 42 dB (PAL)
Frequency range	:	80 Hz to 10,000 Hz

TIMER

Clock	:	24-hour digital indication
No. of events	:	6 events 1 month

TUNER

System	:	Frequency synthesizer
Channel coverage	:	PAL, SECAM B/G VHF: E2–E12, A–H, H1, H2, UHF: E21–E69, CATV: X–Z, S1–S41 SECAM D/K VHF: R1–R12, UHF: E21–E69
RF converter	:	UHF channel 60 (53 – 67, adjustable)

Accessories	:	Aerial cable ..... 1 Remote control unit ..... 1 Batteries (R03) ..... 2 Power cable 1

Designs and specifications are subject to change without notice.

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Power consumption	:	21 W (in operation)

CONNECTORS

Aerial input	:	75 Ω coaxial
Aerial output	:	75 Ω coaxial
Video input	:	AUDIO/VIDEO SCART socket, 1.0 V(p-p), 75 Ω LINE IN 2 VIDEO Phono type jack, 1.0 V(p-p), 75 Ω
Audio input	:	AUDIO/VIDEO SCART socket, 308 mV(rms), more than 10 kΩ LINE IN 2 AUDIO Phono type jacks, 308 mV(rms), more than 47 kΩ
Video output	:	AUDIO/VIDEO SCART socket, 1.0 V(p-p), 75 Ω
Audio output	:	AUDIO/VIDEO SCART socket, 308 mV(rms), less than 1.0 kΩ

VIDEO

Signal-to-noise ratio	:	More than 43 dB (PAL)

AUDIO

Signal-to-noise ratio	:	More than 42 dB (PAL)
Frequency range	:	80 Hz to 10,000 Hz

TIMER

Clock	:	24-hour digital indication
No. of events	:	6 events 1 month

TUNER

System	:	Frequency synthesizer
Channel coverage	:	PAL, SECAM B/G VHF: E2–E12, A–H, H1, H2, UHF: E21–E69, CATV: X–Z, S1–S41 SECAM D/K VHF: R1–R12, UHF: E21–E69
RF converter	:	UHF channel 60 (53 – 67, adjustable)

Accessories	:	Aerial cable ..... 1 Remote control unit ..... 1 Batteries (R03) ..... 2 Power cable 1

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